

LET US UNDERSTAND MATHEMATICS

CLASS 2

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PREFACE

This is part of a series of books based on NCERT syllabus and research on teaching of mathematics for second class. The focus here is on laying a foundation for further learning of mathematics and understanding of concepts and procedures. Accordingly concepts and procedures are presented in many ways - manipulatives, pictures, real world situations, spoken and written words and symbols and opportunities are provided for translation from one mode to another. Applications to daily life and oral work are emphasized. The teachers should provide more practice if necessary for mastery of the concepts and procedures and use objects that are readily available or situations for exercises that are familiar to the children in the class.

The schools that have mathematics labs should provide ample quantities of materials such as counters, tiles, geometrical models, tangram pieces, blocks, geoboards, dot papers, balances, grids, scissor, paper money and ropes. If the schools do not have labs, the children in class 2 should have or be provided with one hundred sticks of the same length, colour size and some rubber bands, and three sets of ten sticks of different thickness, geoboards or dot paper and models of cube, cuboid, cylinder and cone. They can be asked to bring empty boxes, bottles, cardboard and graph paper.

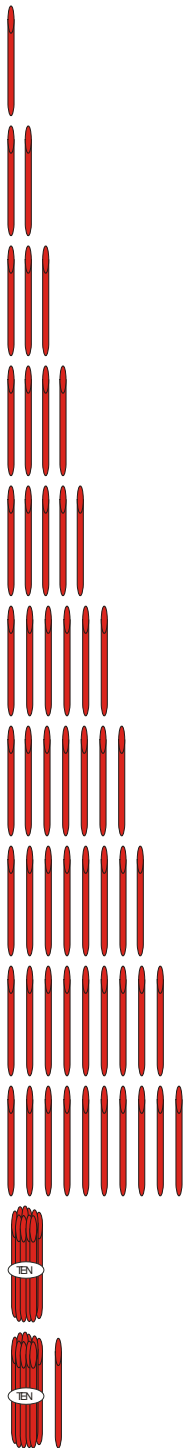
As for most teachers textbook is the curriculum this book is a teaching guide cum workbook for students. The exercises with manipulatives and oral work are included to facilitate the teacher's work. Some activity sheets are also provided that can be removed and used.

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UNIT 1

Review of Numbers 1-100



1

One

2

Two

3

Three

4

Four

5

Five

6

Six

7

Seven

8

Eight

9

Nine

10

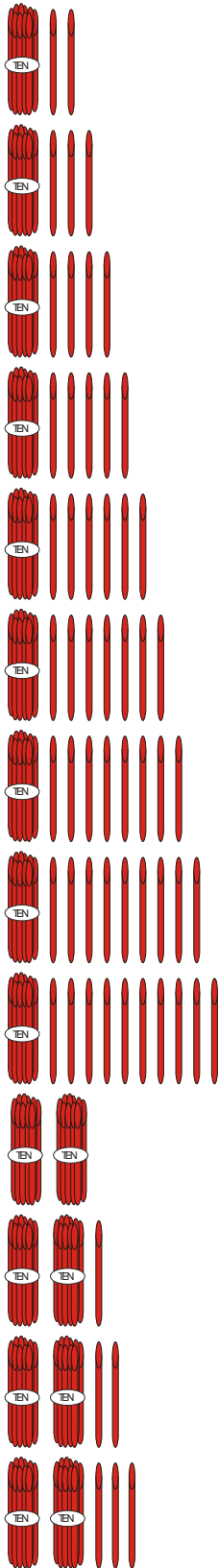
Ten or

10

One ten

$10 + 1 = 11$

Eleven



$$10 + 2 = 12$$

Twelve

$$10 + 3 = 13$$

Thirteen

$$10 + 4 = 14$$

Fourteen

$$10 + 5 = 15$$

Fifteen

$$10 + 6 = 16$$

Sixteen

$$10 + 7 = 17$$

Seventeen

$$10 + 8 = 18$$

Eighteen

$$10 + 9 = 19$$

Nineteen

$$10 + 10 = 20$$

Twenty or

20

Two tens

$$20 + 1 = 21$$

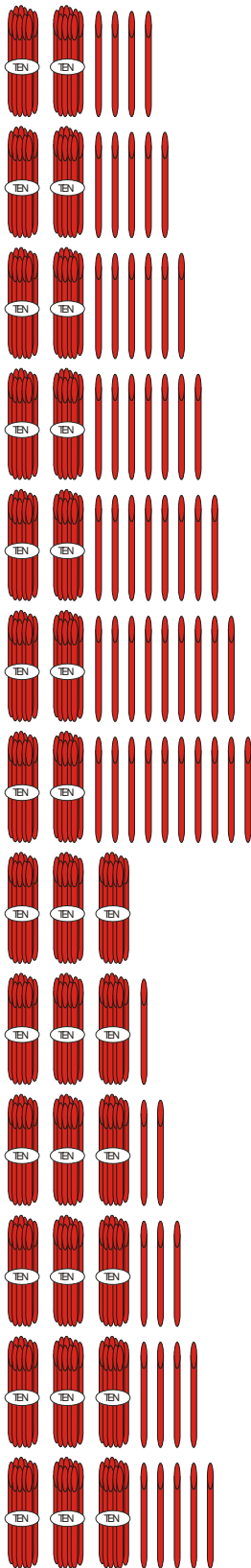
Twenty one

$$20 + 2 = 22$$

Twenty two

$$20 + 3 = 23$$

Twenty three



$$20 + 4 = 24$$

Twenty four

$$20 + 5 = 25$$

Twenty five

$$20 + 6 = 26$$

Twenty six

$$20 + 7 = 27$$

Twenty seven

$$20 + 8 = 28$$

Twenty eight

$$20 + 9 = 29$$

Twenty nine

$$20 + 10 = 30$$

Thirty or

$$30$$

Three tens

$$30 + 1 = 31$$

Thirty one

$$30 + 2 = 32$$

Thirty two

$$30 + 3 = 33$$

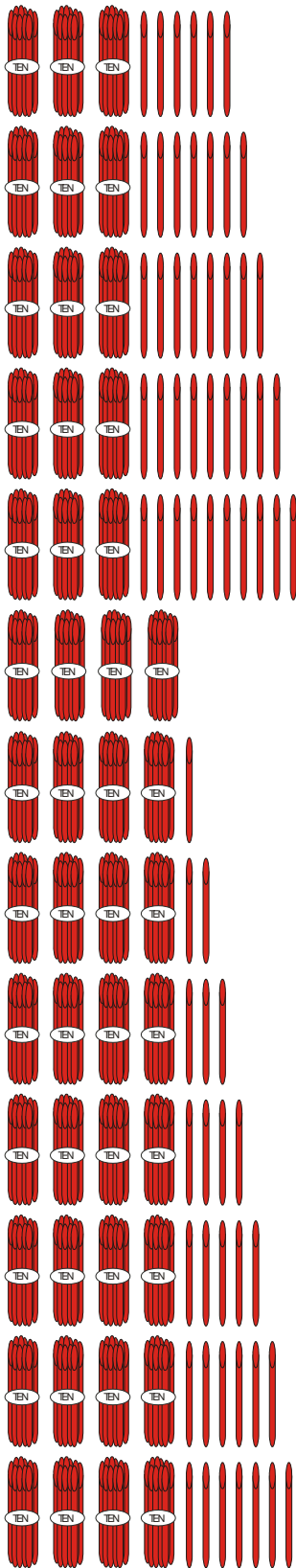
Thirty three

$$30 + 4 = 34$$

Thirty four

$$30 + 5 = 35$$

Thirty five



$$30 + 6 = 36$$

Thirty six

$$30 + 7 = 37$$

Thirty seven

$$30 + 8 = 38$$

Thirty eight

$$30 + 9 = 39$$

Thirty nine

$$30 + 10 = 40$$

Forty or

40

Four tens

$$40 + 1 = 41$$

Forty one

$$40 + 2 = 42$$

Forty two

$$40 + 3 = 43$$

Forty three

$$40 + 4 = 44$$

Forty four

$$40 + 5 = 45$$

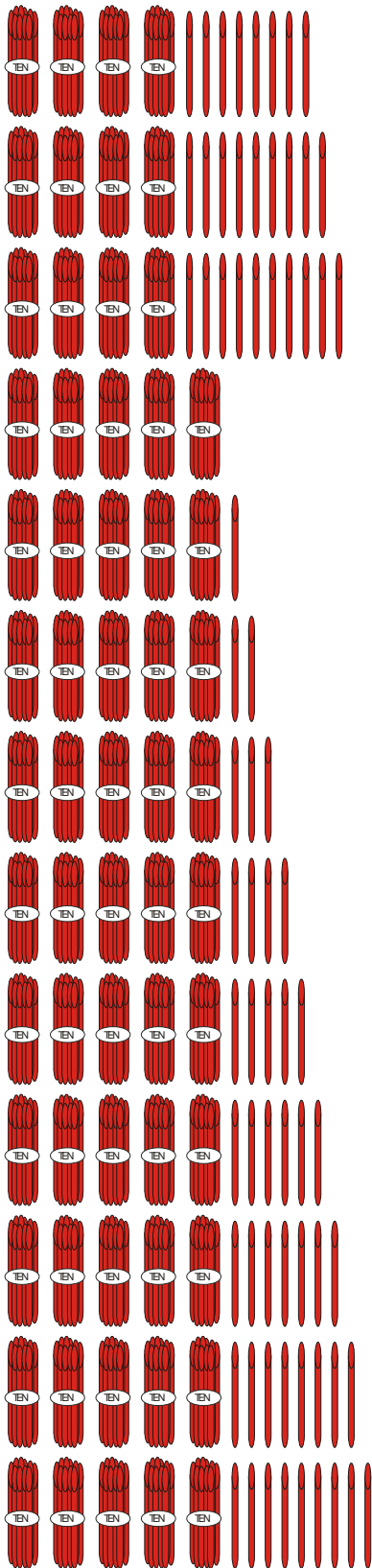
Forty five

$$40 + 6 = 46$$

Forty six

$$40 + 7 = 47$$

Forty seven



$$40 + 8 = 48$$

Forty eight

$$40 + 9 = 49$$

Forty nine

$$40 + 10 = 50$$

Fifty or

$$50$$

Five Tens

$$50 + 1 = 51$$

Fifty one

$$50 + 2 = 52$$

Fifty two

$$50 + 3 = 53$$

Fifty three

$$50 + 4 = 54$$

Fifty four

$$50 + 5 = 55$$

Fifty five

$$50 + 6 = 56$$

Fifty six

$$50 + 7 = 57$$

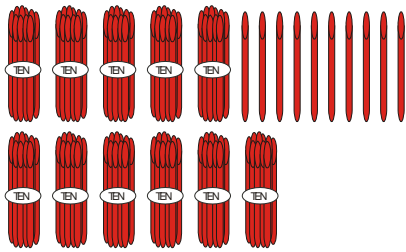
Fifty seven

$$50 + 8 = 58$$

Fifty eight

$$50 + 9 = 59$$

Fifty nine

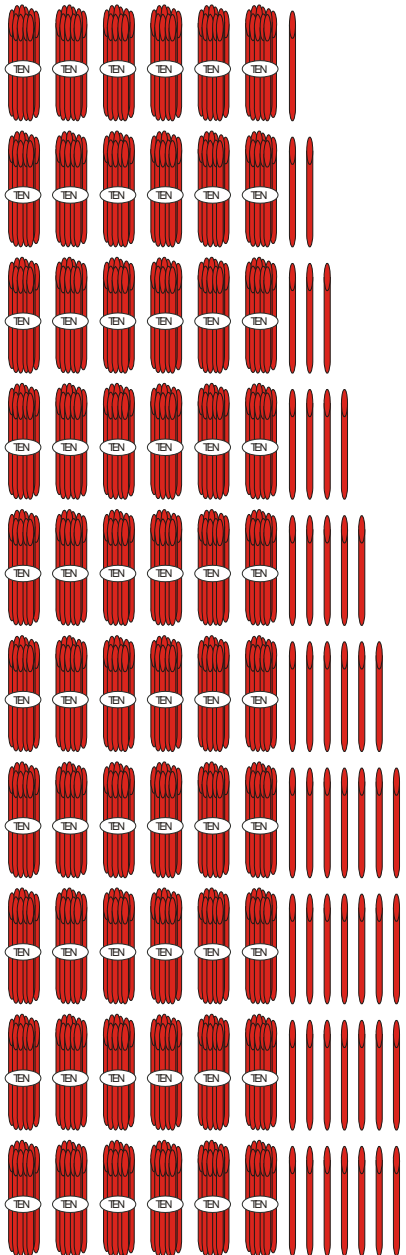


$$50 + 10 = 60$$

Sixty

60

6 Tens



$$60 + 1 = 61$$

Sixty one

$$60 + 2 = 62$$

Sixty two

$$60 + 3 = 63$$

Sixty three

$$60 + 4 = 64$$

Sixty four

$$60 + 5 = 65$$

Sixty five

$$60 + 6 = 66$$

Sixty six

$$60 + 7 = 67$$

Sixty seven

$$60 + 8 = 68$$

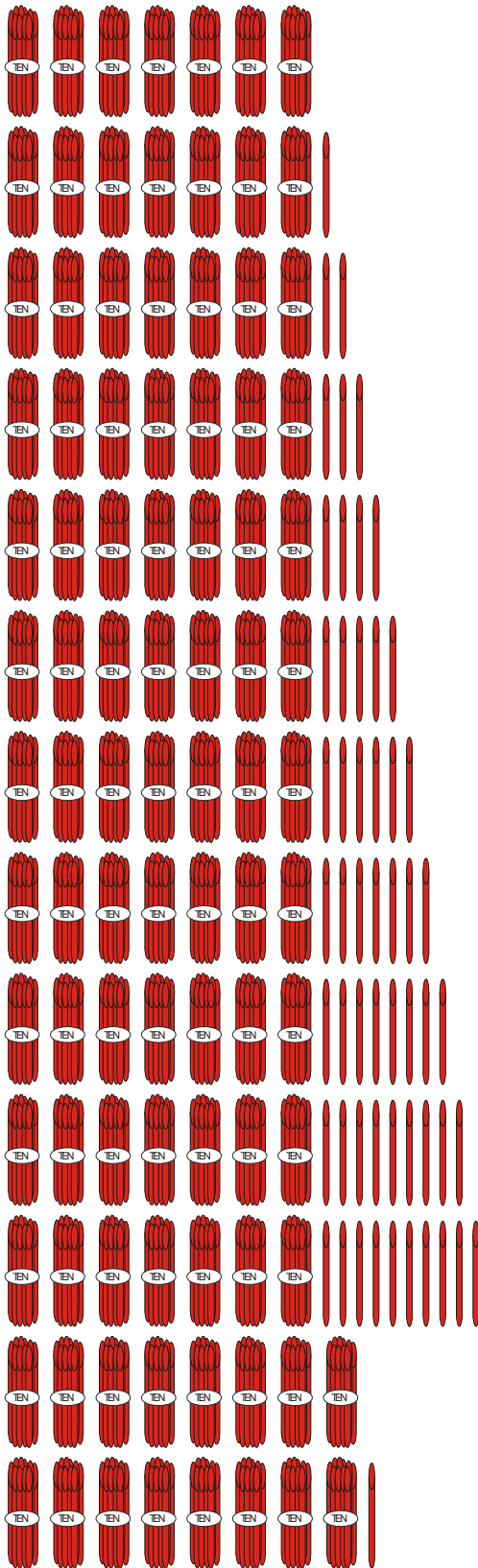
Sixty eight

$$60 + 9 = 69$$

Sixty nine

$$60 + 10 = 70$$

Seventy or



70

7 Tens

$$70 + 1 = 71$$

Seventy one

$$70 + 2 = 72$$

Seventy two

$$70 + 3 = 73$$

Seventy three

$$70 + 4 = 74$$

Seventy four

$$70 + 5 = 75$$

Seventy five

$$70 + 6 = 76$$

Seventy six

$$70 + 7 = 77$$

Seventy seven

$$70 + 8 = 78$$

Seventy eight

$$70 + 9 = 79$$

Seventy nine

$$70 + 10 = 80$$

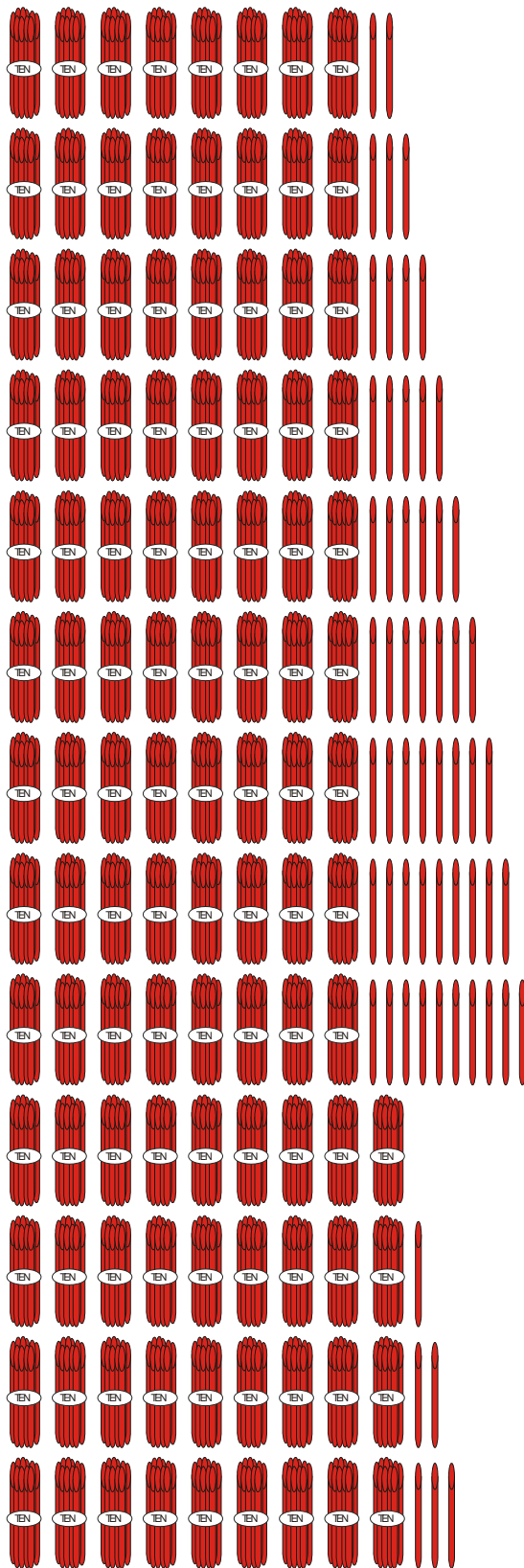
Eighty or

80

Eight tens

$$80 + 1 = 81$$

Eighty one



$$80 + 2 = 82$$

Eighty two

$$80 + 3 = 83$$

Eighty three

$$80 + 4 = 84$$

Eighty four

$$80 + 5 = 85$$

Eighty five

$$80 + 6 = 86$$

Eighty six

$$80 + 7 = 87$$

Eighty seven

$$80 + 8 = 88$$

Eighty eight

$$80 + 9 = 89$$

Eighty nine

$$80 + 10 = 90$$

Ninety or

90

9 Tens

$$90 + 1 = 91$$

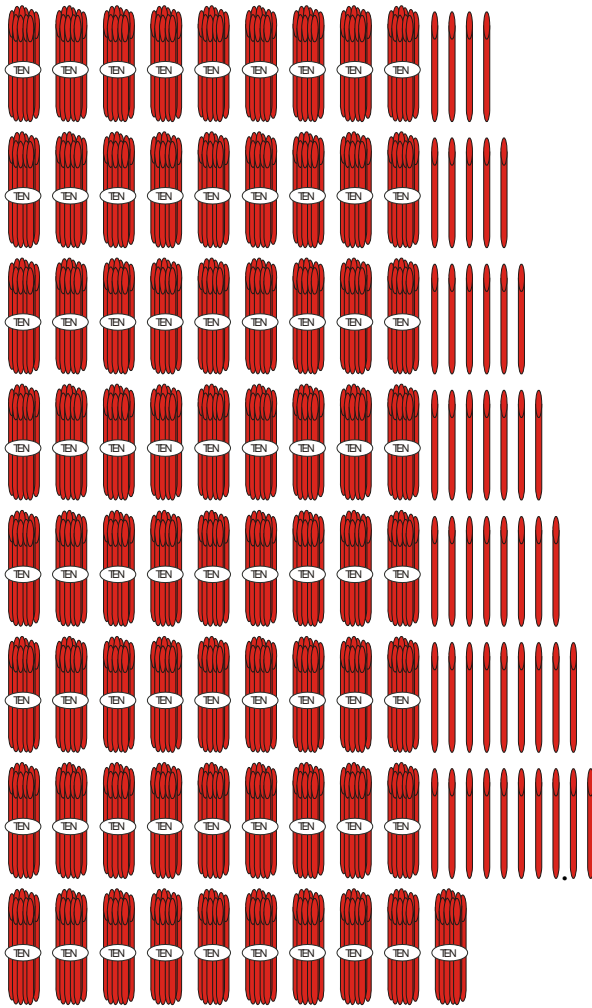
Ninety one

$$90 + 2 = 92$$

Ninety two

$$90 + 3 = 93$$

Ninety three



$$90 + 4 = 94$$

Ninety four

$$90 + 5 = 95$$

Ninety five

$$90 + 6 = 96$$

Ninety six

$$90 + 7 = 97$$

Ninety seven

$$90 + 8 = 98$$

Ninety eight

$$90 + 9 = 99$$

Ninety nine

$$90 + 10 = 100$$

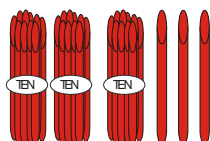
Hundred or

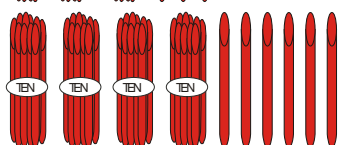
$$100$$

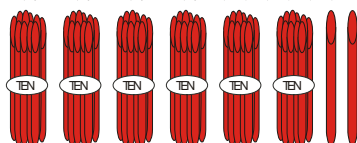
10 Tens

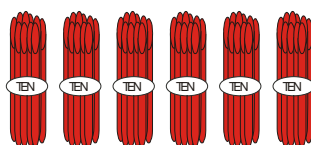
Exercise 1.1

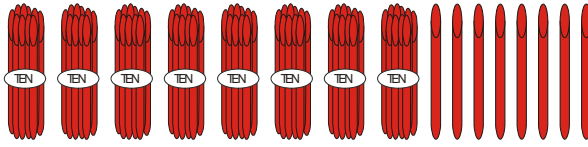
1. Count from 1 to 100.
2. Count the number of girls and boys in the class.
3. Read the following numbers:
6, 12, 14, 39, 56, 72, 43, 27, 79, 58, 86, 90, 31, 66 and 100.
4. Set aside the following numbers of sticks using bundles of ten-sticks and single sticks.
6, 14, 19, 35, 37, 48, 52, 60,
5. A number of ten bundles of sticks and some loose sticks are given below write the number against them:











6. Write the following numbers as sum of tens and ones:

$$35 = 3 \text{ tens} + 5 \text{ ones}$$

$$13 = \underline{\quad} \text{ten} + \underline{\quad} \text{ones}$$

$$45 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

$$69 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

$$27 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

$$75 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

$$60 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

$$8 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

7. Write the numbers for the following:

$$2 \text{ tens} + 5 \text{ ones} = 25$$

$$7 \text{ tens} + 4 \text{ ones} =$$

$$9 \text{ tens} + 9 \text{ ones} =$$

$$6 \text{ tens} + 2 \text{ ones} =$$

$$2 \text{ tens} + 8 \text{ ones} =$$

8. Write the following numbers (to be dictated by the teacher):

9, 18, 23, 38, 54, 67, 90, 82, 46, 59, 41, 75, 14, 28 and 40.

9. What comes after the following numbers, write against them:

63 _____

30 _____

49 _____

99 _____

10. What comes before the following numbers, write against them

45 _____

20 _____

70 _____

100 _____

The Hundred Table

We can also write the numbers in the form of a table

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Copy 100 table in a square notebook

Read the last column-10, 20, 30, 40, 50, 60, 70, 80, 90 and 100. This is called counting by 10 beginning with 10.

Similarly you can count by 10 beginning with any other number by reading numbers in its column e.g. beginning with 3, 13, 23, 33, 43, 53, 63, 73, 83, and 93.

Shade every third number beginning with 3 up to 30 and count by three. Practice it.

Shade every fifth number beginning with 5 up to 50 and count by five. Practice it.

Exercise 1.2

1. Count the numbers from 1 to 100.
5. Count beginning with 4 up to 8.
6. Count beginning with 18 up to 23.
7. Count back numbers from 7 up to 2.
8. Count back numbers from 12 up to 8.
9. Count back the numbers from 100 to 1.
11. Count by 10 beginning with 10 up to 100.
12. Count by 5 beginning with 5 up to 50.
13. Count by 2 beginning with 2 up to 20.
14. Count by 3 beginning with 3 up to 30
15. Read the following numbers:
7, 32, 25, 56, 60, 74, 9, 83, 55, 49, 71, 6, 0, 99, 100, 36, 68, 92, 12 and 58.
16. Write the following numbers (to be dictated by the teacher):
4, 8, 47, 15, 38, 79, 23, 55, 61, 82, 93, 14, 44, 38, 52, 76, 85, 97, 29 and 3.
17. Write the following numbers in figures:

Eighty-one	_____	Thirteen	_____
Seventy-three	_____	Fifty-six	_____
Twenty-four	_____	Forty	_____
Sixty-seven	_____	Ninety-two	_____

Zero	_____	Twelve	_____
Ninety-nine	_____	Sixty-four	_____
Eleven	_____	Fifty-three	_____
Twenty-nine	_____	Thirty-six	_____
Forty-one	_____	Fifty-seven	_____

18. Write the following numbers in words:

5 → _____

33 → _____

61 → _____

87 → _____

12 → _____

54 → _____

26 → _____

48 → _____

96 → _____

100 → _____

17 → _____

25 → _____

14 → _____

37 → _____

19. Which is the smallest one-digit number?

20. Which is the largest one-digit number?

21. Which is the smallest two-digit number?

22. Which is the largest two-digit number?

19. Write two two-digit numbers using 5 and 8, using each digit once only.
Which of these is larger?

20. Note the pattern in each of the following series of numbers. Write the next number using the pattern.

1, 3, 5, 7, ____

6, 9, 12, 15, ____

7, 6, 5, 4, ____

6, 8, 10, 12, ____

5, 10, 15, 20, ____

50, 60, 70, 80, ____

10, 8, 6, 4, ____

20, 19, 18, 17, ____

14, 12, 10, 8, ____

4, 8, 12, 16, ____

45, 46, 47, 48, ____

26, 36, 46, 56, ____

21. Ask the students to visit a shop, find examples of the use of numbers, and present it in class.

26. Write numbers that come just after the following numbers

9	10
36	
49	
90	
79	

Write numbers that come just before the following numbers

44	45
	29
	30
	81
	90

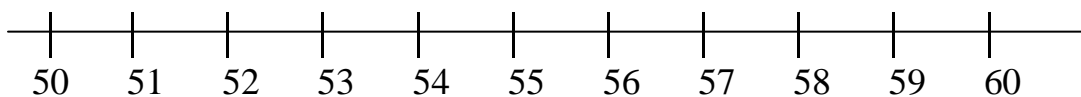
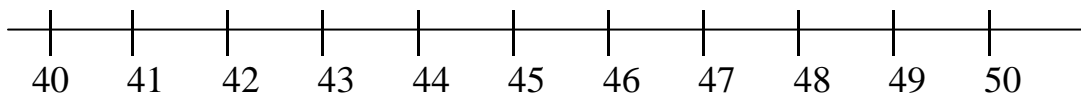
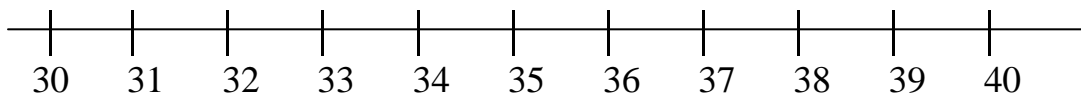
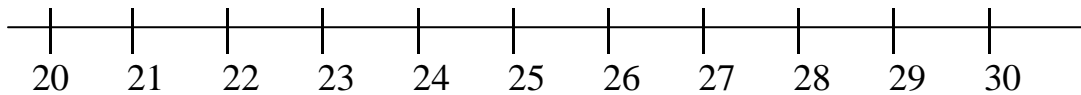
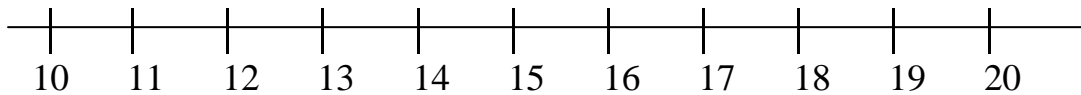
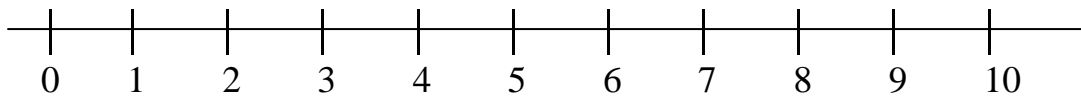
Write numbers that come between the following numbers

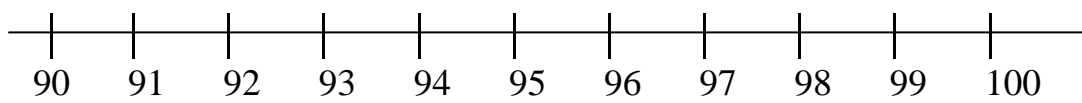
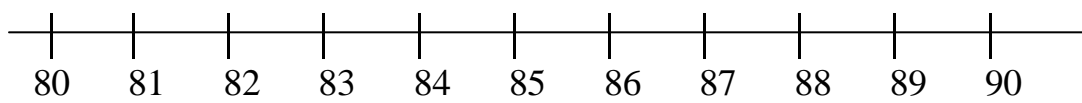
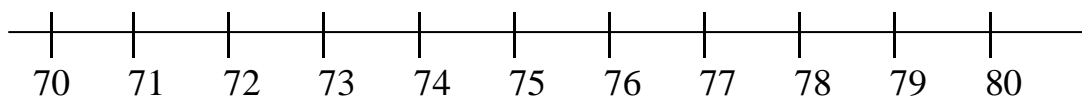
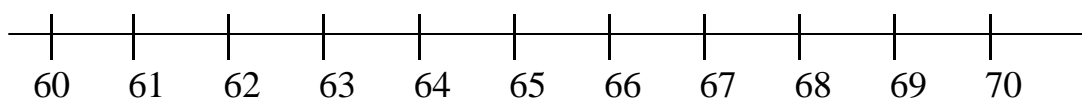
22	23	.24
44		46
78		80
30		32
19		21

Number line

We can also represent numbers on a **number line**. A number line has numbers marked in order at equal distances beginning with zero. Number lines 0-10, 10-20, 20-30, 30-40, 40-50, 50-60, 60-70, 70-80, 80-90, and 90-100 are shown below. As you would have noticed, the last number of a number line and the first number of the next line are the same and we can cut and overlap these to make bigger number lines.

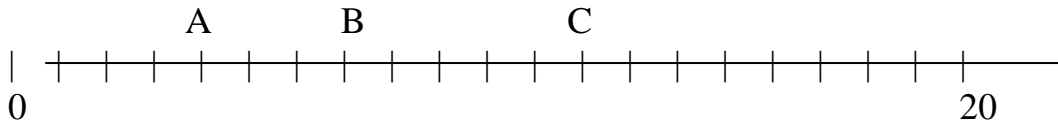
We can also compare numbers by looking at a **number line**. All numbers that are to the right of a number are greater than the number. For example 8, is on the right of 6, therefore $8 > 6$. Similarly, all numbers that are to the left of a number are less than the number. For example 3, is on the left of 6, therefore $3 < 6$.



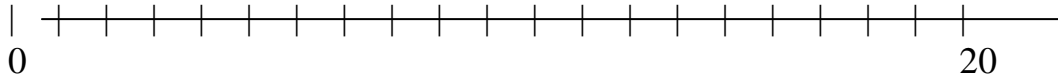


Exercise 1.3

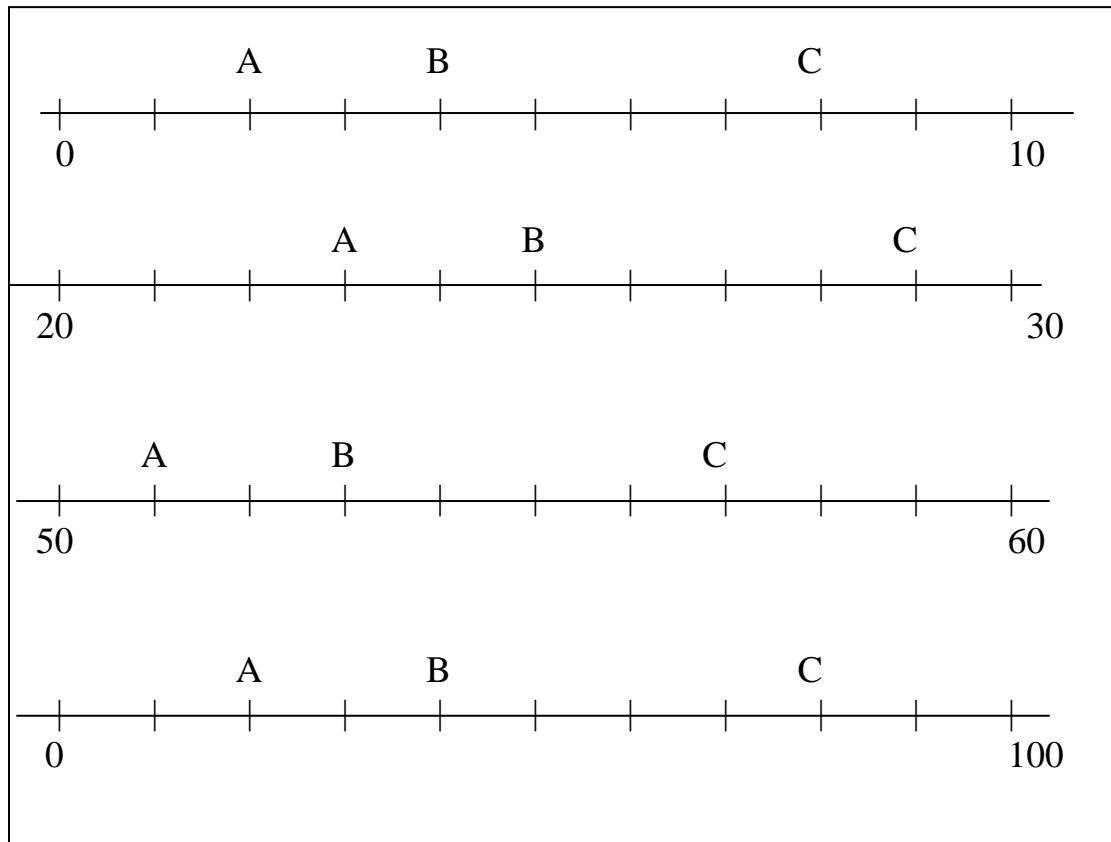
1. A, B, C on the numbers line, represents what numbers.



2. Mark numbers 2, 8, and 17 on the number line given below:



3. Look very carefully at each number line. Write below A, B, C on the number line the numbers that should appear at those points.



4. Which of the following numbers are greater than 7? Encircle them.

3, 5, 9, 10

5. Which of the following numbers are less than 8? Encircle them.

6, 2, 9, 10

Comparison of numbers

We can compare two numbers by their position in counting.

A number that comes later in the counting is greater than the one that comes earlier in counting. We denote 'is greater than' by the symbol $>$.

A number that comes earlier in the counting is less than the one that comes later in counting. We denote 'is less than' by the symbol $<$.

We can also compare two numbers by looking at the digits

A number that has more digits is greater than the number that has fewer digits e.g. $47 > 9$, $30 > 5$, $90 > 9$

A number that has fewer digits is less than the number that has more digits e.g. $7 < 23$, $8 < 55$, $4 < 40$.

If the number of digits is the same in both numbers, we look at the number of tens, the number that has larger number of tens is greater than the number that has smaller number of tens $42 > 25$, $68 > 39$, $23 > 18$. Or the number that has smaller number of tens is less than the number that has larger number of tens e.g. $22 < 53$, $68 < 85$, $49 < 50$.

If the number of tens is the same in both the numbers, then we look at ones, the number that has larger number of ones is greater than the number that has smaller number of ones $45 > 42$, $68 > 65$, $23 > 20$. Or the number that has smaller number of ones is less than the number that has larger number of ones e.g. $22 < 23$, $65 < 69$, $43 < 47$.

Exercise 1.4

1. Compare the following numbers by writing $</>/=$ between the following numbers:

9		4
22		36
52		35
99		100
41		14

5		7
19		18
56		92
78		72
48		84

2. Arrange the following numbers from smallest to largest:

(a) 34, 78, 23

(b) 15, 70, 43

(c) 25, 47, 12, 67

3. Arrange the following numbers from largest to smallest:

(a) 36, 27, 52

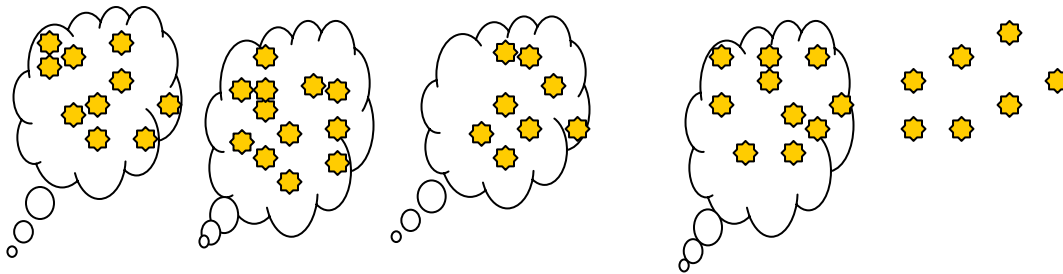
(b) 49, 31, 69

(c) 47, 79, 12, 80

4. Write two digit numbers using digits 5 and 8, using each digit once only; which of these is larger.

Review of place value

Our number system is based on ten. If we have a large number of objects, it becomes cumbersome to count them. We group those into as many groups of ten objects as we can. We then count by ten and then add the left over objects. For example to count the stars given below, we group them by ten by drawing lines around ten stars until less than ten stars are left over. We were able to form four groups of ten and seven stars were left over. We count four numbers by ten-10, 20, 30, 40 and count forward 7 numbers that gives forty-seven. Thus the number of stars is forty-seven.



Numbers are written by writing first the number of left over objects and then the number of ten groups to the left of that e.g. 47 in this case. The place (number on the right) where ones are written is called **one's place**; the place (number on the left) where tens are written is called **ten's place**. This enables us to write all numbers up to 99 by using only ten digits 0-9. We can in fact write very large numbers that we will learn later by using ten digits only and using more places to the left.

We can express a number as sum of tens and ones, this is called **expanded form** of a number e.g. $47 = 4 \text{ tens} + 7 \text{ ones}$, $32 = 3 \text{ tens} + 2 \text{ ones}$, $80 = 8 \text{ tens} + 0 \text{ ones}$.

We can write the number given the tens and ones in it by writing first the number of tens and then to its right the number of ones e.g. 4 tens + 7 ones = 47, 6 tens + 9 ones = 69, 5 tens + 0 ones = 50.

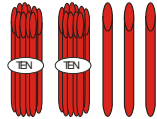
Place value of digits in different places

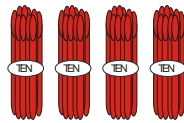
The value of the digit in one's place is the same as the digit in one's place e.g. 7 in 47, 9 in 69, 0 in 50.

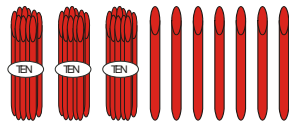
The value of the digit in ten's place is the same as many tens as the digit in ten's place e.g. 4 tens or 40 in 47, 6 tens or 60 in 69, 5 tens or 50 in 50.

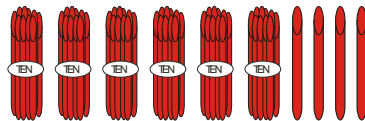
Exercise 1.5

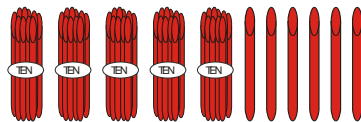
- Show the following numbers of sticks using single sticks and bundles of ten sticks:
25, 11, 46, 53, 68, 90, 72, 84, 39, 4, 10, 7, 60, 44, 56.
- A number of groups of bundles of ten sticks and single sticks are given below, write the total number of sticks against them:

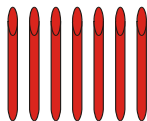


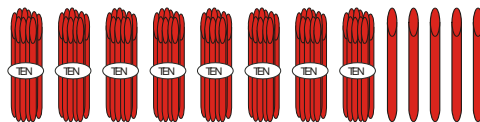


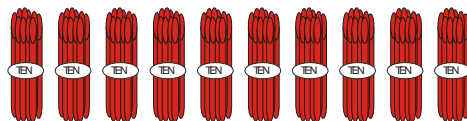












- If you have the number of sticks given below, write how many bundles of 10 sticks you can make and how many sticks would be left over.

Number of sticks	Number of ten bundles of sticks	Number of left over sticks
13	1	3
21		
34		
42		
56		
60		
72		
25		
36		
40		

Exercise 1.6

Using paper money set aside the following number of ten rupees notes and one rupee notes and find the total amount of money (or if paper money is not available-if a person has the following notes, how much money does he have?):

- | | |
|---|----------------------|
| 1. 4 ten rupee notes and 5 one rupee notes = | <div>45 rupees</div> |
| 2. 6 ten rupee notes = | <div>rupees</div> |
| 3. 3 one rupee notes = | <div>rupees</div> |
| 4. 7 ten rupee notes and no one rupee notes = | <div>rupees</div> |
| 5. 9 ten rupee notes and 6 one rupee notes = | <div>rupees</div> |
| 6. 8 ten rupee notes and 3 one rupee notes = | <div>rupees</div> |
| 7. 5 ten rupee notes and 5 one rupee notes = | <div>rupees</div> |
| 8. 1 ten rupee notes and 4 one rupee notes = | <div>rupees</div> |
| 9. 2 ten rupee notes and 5 one rupee notes = | <div>rupees</div> |
| 10. 5 ten rupee notes and 7 one rupee notes = | <div>rupees</div> |

Exercise 1.7

1. Write the numbers for which the number of tens and ones are given below:

6 tens and 4 ones

64

4 tens and 7 ones

8 tens and 2 ones

5 tens

9 tens and 6 ones

1 ten and 3 ones

8 ones

2. Write the following numbers in expanded form (the number of tens and ones in it):

$$42 = 4 \text{ tens} + 2 \text{ ones}$$

$$67 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

$$80 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

$$17 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

$$8 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

$$95 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

$$24 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

$$39 = \underline{\quad} \text{tens} + \underline{\quad} \text{ones}$$

Exercise 1.8

1. Write the place of the underlined digit (tens or ones) in the space provided:

2 5 5 ones

4 7 4 tens

6 4 _____

3 8 _____

9 1 _____

2. Find the place value of the following digits in the given numbers and write it in the box against them:

5 in 56

5 tens = 50

7 in 47

--

1 in 18

--

3 in 30

--

6 in 6

--

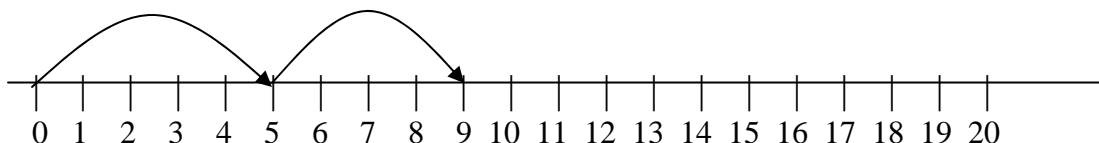
UNIT 2

Addition

Review of addition facts

The sum of any two one-digit numbers is called an **addition fact**. We can add two one-digit numbers by any of the following methods.

1. Using objects say sticks. For example to add 4 and 3, set aside 4 sticks and 3 sticks in two separate heaps then combine the two heaps and count all the sticks. The count would be 7. Therefore $4 + 3 = 7$.
2. Drawing objects say lines. For example to add 3 and 4, draw 3 lines - ||| and 4 lines - |||| and count all the lines. The count would be 7. Therefore $3 + 4 = 7$.
3. Using a **number line**. A number line is a line in which numbers are marked in order at equal distances beginning with zero. Addition is interpreted as moving two specified distances to the right. For example to add $5 + 4$, we begin at 0. Move 5 spaces to the right and we land up at 5. Move 4 more spaces to the right of that, we land up at 9. The number 9 where you end up gives the sum of 5 and 4.



4. Counting forward from one number as many numbers in order as the second number. The last number gives the sum. For example to add 4 and 2, we count forward 2 numbers 5 and 6. As the last number is 6, therefore $4 + 2 = 6$.

5. Verify

$$2 + 1 = 1 + 2 = 3$$

$$3 + 2 = 2 + 3 = 5$$

$$4 + 2 = 2 + 4 = 6$$

$$4 + 3 = 3 + 4 = 7.$$

We notice that the order of numbers in addition does not matter.

Thus, we may count forward from larger number as many numbers in order as the smaller number. The last number gives the sum. For example to add 2 and 6, instead of counting forward 6 numbers from 2-3, 4, 5, 6, 7, and 8 we can count forward 2 numbers from 6-7 and 8.

6. Using table of addition facts.

Table of addition facts

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

The first row represents the sums $0 + 0$, $0 + 1$, $0 + 2$, $0 + 3$ and so on. The first column represents the sums $1 + 0$, $2 + 0$, $3 + 0$ and so on.

The cells with red borders in the diagonal give the doubles that is $0 + 0$, $1 + 1$, $2 + 2$, $3 + 3$, and so on.

To find the sum of other numbers:

Locate the column with one of the numbers at the top and highlight or shade it.

Locate the row with the other number on the side of the table and highlight or shade it.

Locate the cell in which the row and column meet. The number in the cell gives the sum of those numbers.

For example to find the sum of $6 + 8$, locate 6 among the numbers at the top and highlight the column, locate 8 on the side of the table and highlight the row Find the number in the cell where the row and column meet. As the highlighted column and row meet in the cell which has 14 in it, $6 + 8 = 14$.

7. Memorizing addition facts. This is aided by generalizations:

Any number $+ 0 =$ the number.

Any number $+ 1 =$ the number that comes just after it.

The sum of two numbers in any order is the same. For example if we remember $6 + 3 = 9$, then as $3 + 6$ is the same as $6 + 3$, therefore $3 + 6 = 9$.

Addition facts also enable us to add tens to tens and hundreds to hundreds. That is $2 \text{ tens} + 3 \text{ tens} = 5 \text{ tens}$, $3 \text{ hundreds} + 4 \text{ hundreds} = 7 \text{ hundreds}$. This together with the concept of place value facilitates adding very large numbers very quickly.

The test given on next page would enable you to check how many number facts you can recall from memory. Mark an X for the facts that you cannot recall immediately, and find those using any of the methods given above and memorise those.

Mastery test on addition facts

$$\begin{array}{r} 4 \\ +3 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 5 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +3 \\ \hline \end{array}$$

$$\hline$$

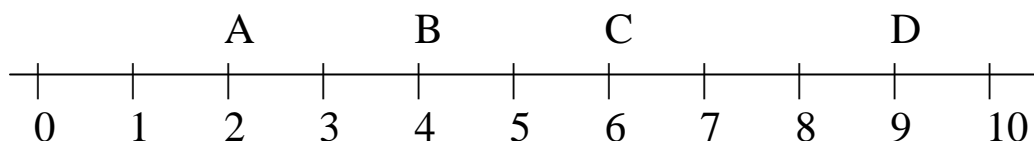
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$$\hline$$

Exercise 2.1

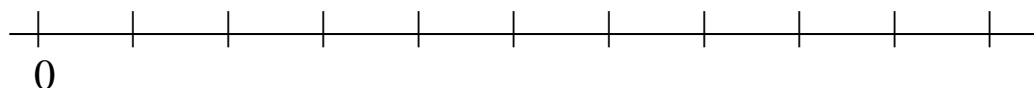
1. Which numbers on the number line are represented by

A _____ B _____ C _____ D _____

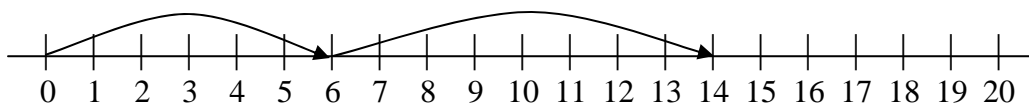


2. Write the numbers on the number line given below and mark the following points on it:

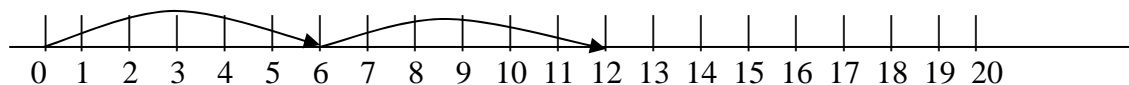
A - 3 spaces to the right of zero, B - 2 spaces to the right of A
C - 4 spaces to the right of zero, D - 5 spaces to the right of C.

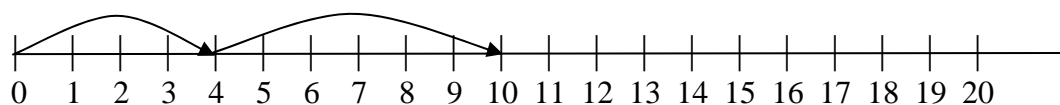
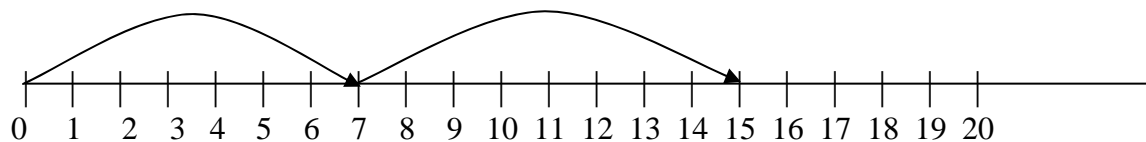


3. Write the addition facts shown on the number lines given below under them:



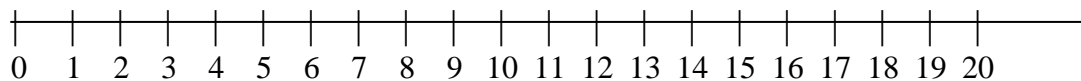
$$6 + 8 = 14$$



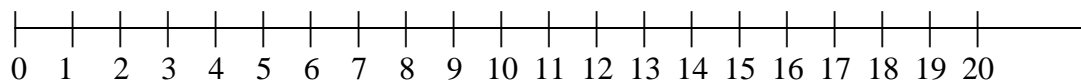


4. Use the number lines given below to find the following addition facts:

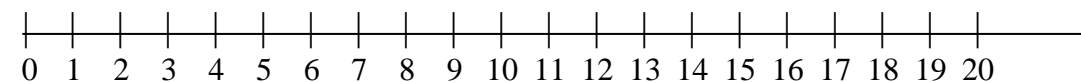
$2 + 3$



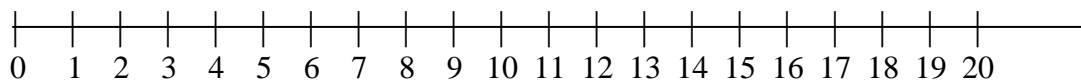
$5 + 6$



$6 + 7$

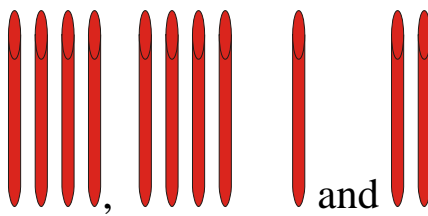

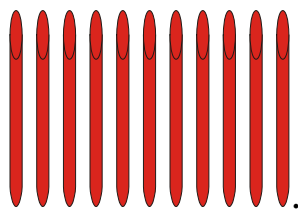


$3 + 9$

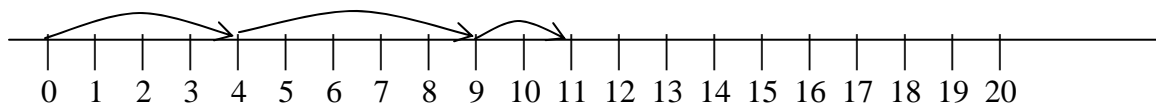


Addition of three one-digit numbers

Addition of three numbers may be interpreted as number of objects obtained by combining three groups of objects; the number of objects in the combined group gives the sum of three numbers. For example if we have 3 heaps of 4 sticks, 5 sticks and 2 sticks. If we combine them we would have 11 sticks in the combined heap.

Combining , and  we get .

It can also be interpreted as moving as many spaces to the right as the first number, then as many spaces to the right of that as the second number and then as many spaces to the right of that as the third number on the number line. The number we arrive at on the number line gives the sum. For example to add $4 + 5 + 2$, we first move four spaces to the right to arrive at 4 on the number line, then 5 more spaces to the right of 4 to arrive at 9 and then 2 more spaces to the right of 9 and arrive at 11, thus $4 + 5 + 2 = 11$.



Verify

$$4 + 3 + 2 = 4 + 2 + 3 = 9,$$

$$7 + 6 + 3 = 7 + 3 + 6 = 16 \text{ and}$$

$$5 + 2 + 8 = 8 + 2 + 5 = 15.$$

Thus, the numbers can be added in any order.

Thus, we may add first the two numbers for which we can immediately recall the sum and then add the third one to the sum

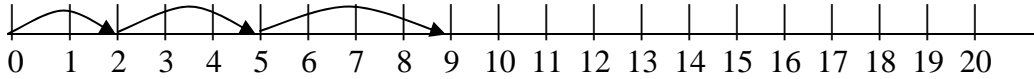
of these two. If the two numbers add to ten, we may add those first as adding to ten is easier. Recall

11 is 1 more than 10, 12 is 2 more than 10, 13 is 3 more than 10 and so on. Therefore $10 + 1 = 11$, $10 + 2 = 12$, $10 + 3 = 13$, $10 + 4 = 14$ and so on. If the two numbers add to more than ten you may add the third by counting forward.

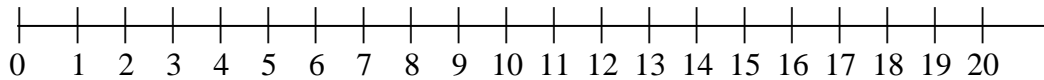
Exercise 2.2

Add the numbers by using the number lines given below and write the sum:

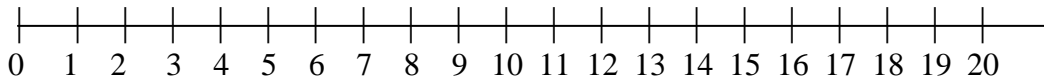
1. $2 + 3 + 4 = 9$.



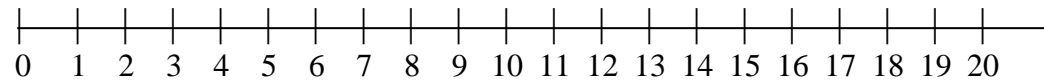
2. $4 + 5 + 5 =$



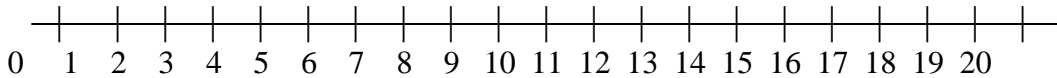
3. $5 + 6 + 2 =$



4. $3 + 7 + 6$



5. $5 + 7 + 6$



Exercise 2.3

Add

$$\begin{array}{r} 3 \\ 2 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ 1 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ 5 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ 5 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ 4 \\ + 7 \\ \hline \end{array}$$

$$\hline$$

$$\begin{array}{r} 7 \\ 6 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ 4 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ 1 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ 3 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ 4 \\ + 8 \\ \hline \end{array}$$

$$\hline$$

$$\begin{array}{r} 7 \\ 7 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ 9 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ 5 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ 7 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ 8 \\ + 3 \\ \hline \end{array}$$

$$\hline$$

Magic Squares

In a magic square all the numbers in the square across, down or diagonally add up to the same number. For example all the numbers in this square across down or diagonally add up to 12.

3	5	4
5	4	3
4	3	5

Use numbers 4, 5 and 6 using each 3 times to complete the magic square with a sum of numbers equal to 15 along rows, columns and across diagonals

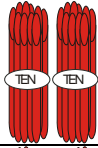
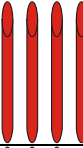
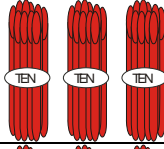

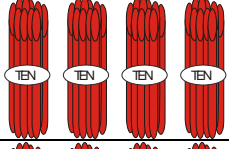

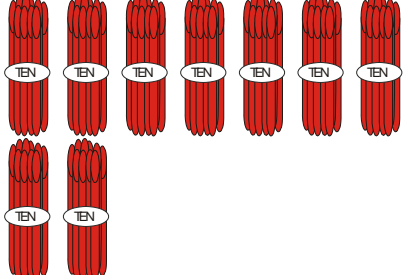
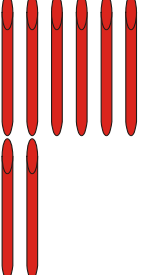
Use the numbers 1, 2, 3, 4, 5, 6, 7, 8 and 9 in the square given below so that they add up to number 15 along the rows, columns and across.

	9	2
3		
	1	

Addition of Two-digit Numbers that do not require grouping

We can add two digit numbers by

- Using sticks. For example to add 24, 33 and 41, we can set aside 2 bundle of ten sticks and 4 sticks for 24 sticks, 3 bundle of ten sticks and 3 sticks for 33 sticks and 4 bundles of ten sticks and 1 stick for 41 sticks combine the two and count the bundles of ten sticks and single sticks in the combined group and find the number.

Numbers	Tens	Ones	Tens	Ones
24			2	4
33				
+41			4	1
			9	8

- Express the numbers in tens and ones and add the tens and ones

$$24 = 2 \text{ Tens} + 4 \text{ Ones}$$

$$33 = 3 \text{ Tens} + 3 \text{ Ones}$$

$$+ 41 = 4 \text{ Tens} + 1 \text{ One}$$

$$= 9 \text{ Tens} + 8 \text{ Ones} = 98.$$

The combined group has 9 tens and 8 ones, which is the same as 98, therefore $24 + 33 + 41 = 98$.

- Write the numbers in a column aligning the ones with ones and tens with tens. Add the ones and tens remembering that the right digit represents the ones and left digit represents the tens.

$$\begin{array}{r}
 \text{TO} \\
 24 \\
 33 \\
 +41 \\
 \hline
 98 \\
 \hline
 \end{array}$$

Addition of two-digit and one-digit numbers

You can count forward from a two-digit number as many numbers as one-digit number. For example, to add 3 to 65 count forward three numbers-66, 67 and 68, as the last number is 68, $65 + 3 = 68$. You can also write the expanded form of two numbers writing 0 for tens for a one-digit number and add the tens and ones. For example,

$$65 = 6 \text{ tens} + 5 \text{ ones}$$

$$3 = 0 \text{ tens} + 3 \text{ ones}$$

$$6 \text{ tens} + 8 \text{ ones} = 68.$$

You may also use the short form. Write the numbers in a column aligning the ones of the two numbers for example, to find $35 + 4$, write 4 below 35, aligning 4 with 5 of 35. Add the ones and write tens to the left of that

$$\begin{array}{r}
 \text{TO} \\
 35 \\
 +4 \\
 \hline
 39 \\
 \hline
 \end{array}$$

Exercise 2.4

1. Set aside the following number of sticks using bundles of ten sticks and single sticks, combine the two groups and find the number of sticks in the combined group:

24 and 35

23, 14, 31

45, 32, 22

32, 42, 13

50, 28, 11

Add the following numbers by first writing the numbers in expanded form and then adding the ones and tens:

$$22 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$

$$13 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$

$$+54 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$

$$\underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones} = \underline{\hspace{2cm}}$$

$$45 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$

$$12 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$

$$+40 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$

$$\underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones} =$$

$$52 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$

$$20 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$

$$+23 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$

$$\underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones} =$$

Exercise 2.5

1. Add the numbers given below in the head:

(a) $20 + 40 = 2 \text{ tens} + 4 \text{ tens} = 6 \text{ tens} = 60.$

(b) $30 + 20 =$

(c) $40 + 50 =$

(d) $40 + 7 =$

(e) $34 + 5 =$

(f) $45 + 21 =$

(g) $56 + 12$

2. Add

$$\begin{array}{r} \text{T O} \\ 23 \\ 12 \\ +34 \\ \hline \end{array}$$

$$\begin{array}{r} \hline 53 \\ 20 \\ +26 \\ \hline \end{array}$$

$$\hline$$

$$\begin{array}{r} 23 \\ 13 \\ +43 \\ \hline \end{array}$$

$$\begin{array}{r} \hline 30 \\ 39 \\ +20 \\ \hline \end{array}$$

$$\hline$$

$$\begin{array}{r} \text{T O} \\ 12 \\ 41 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} \hline 33 \\ 22 \\ 31 \\ \hline \end{array}$$

$$\hline$$

$$\begin{array}{r}
 \text{TO} \\
 45 \\
 12 \\
 +32 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \hline
 54 \\
 11 \\
 +33 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \hline
 22 \\
 34 \\
 +23 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{TO} \\
 45 \\
 13 \\
 +21 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \hline
 75 \\
 2 \\
 +22 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \hline
 33 \\
 2 \\
 +13 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{TO} \\
 41 \\
 23 \\
 +32 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \hline
 46 \\
 43 \\
 +10 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \hline
 52 \\
 2.4 \\
 + 2 \\
 \hline
 \end{array}$$

Addition of Two Digit Numbers that requires grouping

Using sticks:

1. Set aside separately as many sticks as the two numbers using one-sticks and ten-sticks.
2. Combine the one-sticks and ten-sticks and count the one-sticks. If the sum of one-sticks is ten or more, exchange 10 one-sticks with one ten-stick and combine that with ten-sticks. Count the total number of ten-sticks.
3. If the sum of ten sticks is ten or more than ten, exchange 10 ten-sticks with one hundred-stick.
4. Write the total number of sticks from the number of hundred-sticks, ten sticks and one-sticks in the combined group which gives the sum.

Example 1

Add 45 and 37.

To add 45 and 37, we set aside 2 ten-sticks and 5 one-sticks for 45 sticks (row 1 on next page) and 3 ten-sticks and 7 one-sticks sticks for 37 sticks (row 2).

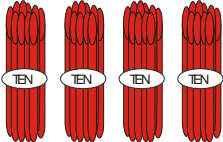
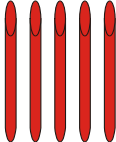
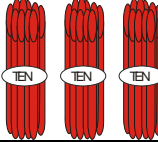
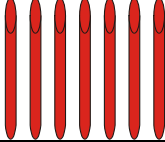
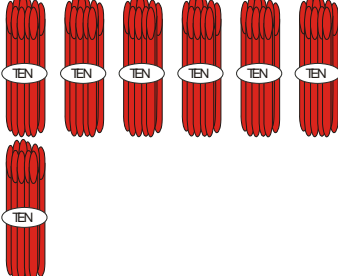
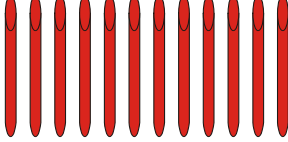
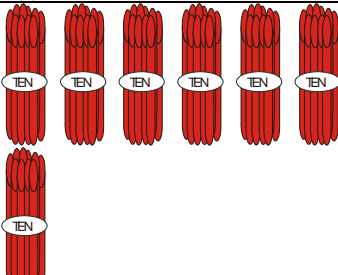
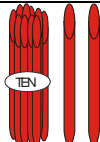
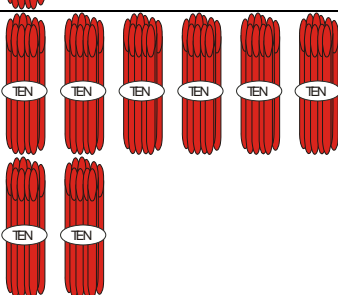

Combine the one-sticks and ten-sticks (row 3) and count the one-sticks in the combined group.

As there are 12 one-sticks in the combined group, we exchange 10 of those with one ten-stick and two sticks are left over (row 4).

We combine that ten-stick with 7 ten-sticks (row 5).

Thus we would have 8 ten-sticks and 2 one-sticks (row 5), which is the same as 82 sticks.

Therefore $45 + 37 = 82$.

Number	Ten-sticks	One-sticks	Tens	Ones
45			4	5
+37			3	7
=			7	12
=				
= 82			8	2

Use expanded form

1. Express the numbers in tens and ones.
2. Add the ones to ones and tens to tens.
3. If the number of ones is 10 or more, regroup ones to tens and ones.
4. Add the ten to sum of tens.

5. If the number of tens now is 10 or more regroup tens to hundreds and tens and write the number.

Example 2

Add 36 and 57.

We can write

$$\begin{aligned} 36 &= 3 \text{ Tens} + 6 \text{ Ones} \\ + 57 &= 5 \text{ Tens} + 7 \text{ Ones} \\ \hline \end{aligned}$$

$$\begin{aligned} &= 8 \text{ Tens} + 13 \text{ Ones} \\ &= 8 \text{ tens} + 1 \text{ ten} + 3 \text{ ones} \\ &= 9 \text{ tens} + 3 \text{ ones} \\ &= 93 \end{aligned}$$

Short form

1. Write the numbers in a column so that one's place and ten's place of two numbers are aligned.
2. Add the ones.
3. If the number of ones is 10 or more, regroup ones as tens and ones. Write ones in one's place and tens in the ten's place above the numbers to remind you that these are to be added while adding the tens.
4. Add the tens.
5. If the number of tens is 10 or more regroup tens to hundreds and tens and write it in hundred's place to the right of tens place.

Example 3

Add 35 and 45.

To add 35 to 45 we write the numbers so that one's and ten's places of the two numbers are aligned.

Then add the ones, as there are 10 ones, ten ones are grouped into one ten and 0 ones. Zero is written in one's place and 1-ten is written above in the ten's place.

Then adding the tens gives 8 tens

$$\begin{array}{r}
 \text{TO} \\
 1 \\
 35 \\
 +45 \\
 \hline
 80 \\
 \hline
 \end{array}$$

Addition of two-digit and one-digit numbers

1. We can count forward from a two-digit number as many numbers as one-digit number. For example, to add 7 to 55 count forward seven numbers-56, 57, 58, 59, 60, 61 and 62, as the last number is 62, $55 + 7 = 62$.
2. We can also write the expanded form of two-digit number writing 0 tens for a one-digit number and add.

Example 4

$$55 = 5 \text{ tens} + 5 \text{ ones}$$

$$7 = 0 \text{ tens} + 7 \text{ ones}$$

$$= 5 \text{ tens} + 12 \text{ ones} = 5 \text{ tens} + 1 \text{ ten} + 2 \text{ ones} = 6 \text{ tens} + 2 \text{ ones} \\ = 62.$$

3. We may also use the short form; remembering to align one-digit number with one's place of the two-digit number.

Example 5

T O

1

55

+ 7

62

Exercise 2.6

1. Set aside the number of one-sticks given below. Exchange as many one-sticks with ten-sticks as you can:
15, 12, 10, 18, 17, 16, 14, 19, 11, 13, 20, 23, 25, 27 and tell the number of ten-sticks and one-sticks you have.
2. Set aside the following number of sticks using ten-sticks and one-sticks. Combine the two groups and find the number of sticks in the combined group:
 - (a) 17, 25
 - (b) 24, 39
 - (c) 45, 32
 - (d) 47, 37, 14
 - (e) 26, 28, 36
 - (f) 38, 44, 10
 - (g) 34, 9
 - (h) 45, 34, 14
 - (i) 57, 16, 17
 - (j) 10, 65, 8

Exercise 2.7

Add the following numbers by first writing the numbers in expanded form and adding the ones to ones and tens to tens:

1. $17 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$
 $+54 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$

$$\underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones} = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$
$$= \underline{\hspace{1cm}}$$

2. $35 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$
 $+48 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$

$$\underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones} = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$
$$= \underline{\hspace{1cm}}$$

3. $47 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$
 $+29 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$

$$\underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones} = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$
$$= \underline{\hspace{1cm}}$$

4. $67 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$
 $+28 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$

$$\underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones} = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$$
$$= \underline{\hspace{1cm}}$$

5. $45 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$
 $36 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$
 $+14 = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones}$

$$\underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones} = \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ tens} + \underline{\hspace{1cm}} \text{ ones} =$$
$$\underline{\hspace{1cm}}$$

6. $18 = \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$

$35 = \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$

$+29 = \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$

$\underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones}$ $= \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{tens} + \underline{\hspace{1cm}} \text{ones} =$

Exercise 2.8

Fill in the blanks:

1. 16 Ones = 1 ten + 6 ones.
2. 10 Ones = ____ ten + ____ ones.
3. 12 tens = ____ hundred + ____ tens.
4. Add

T O

$$\begin{array}{r} 23 \\ +48 \\ \hline \end{array}$$

$$\begin{array}{r} 38 \\ +24 \\ \hline \end{array}$$

$$\begin{array}{r} 39 \\ +45 \\ \hline \end{array}$$

T O

$$\begin{array}{r} 37 \\ +26 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ +27 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \\ +37 \\ \hline \end{array}$$

T O

$$\begin{array}{r} 48 \\ +26 \\ \hline \end{array}$$

$$\begin{array}{r} 76 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 46 \\ +39 \\ \hline \end{array}$$

TO	TO	TO
67	46	69
+29	32	21
-----	+ 8	+ 9
-----	-----	-----
78	18	74
+19	42	23
-----	+ 8	+ 9
-----	-----	-----
35	17	TO
27	43	25
+25	+27	44
-----	-----	+18
-----	-----	-----
46	68	53
14	12	14
+35	+17	+27
-----	-----	-----
-----	-----	-----
23	39	-----
27	13	-----
+46	+47	-----
-----	-----	-----
-----	-----	-----

Exercise 2.9

1. There are 20 boys and 17 girls in a class. How many children are there in the class?
2. Anuj had 18 rupees his mother gave him 25 rupees. How much money does he have now?
3. Bakul bought one book costing 27 rupees and another book costing 38 rupees. How much money did he spend in all?
4. There were 34 children in a class, 9 more children were admitted in the new session. How many children are there in the class now?
5. There were 45 mango trees and 27 more mango trees were planted in a garden. How many mango trees are there now?

6. Raman has 12 coloured pencils and 5 black pencils. How many pencils does he have in all?

UNIT 3

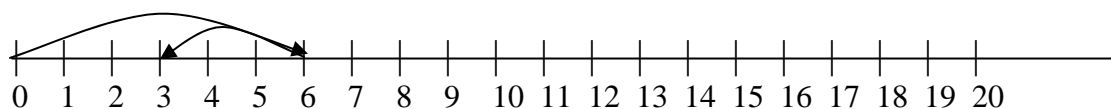
Subtraction

Subtraction facts

Subtraction of two numbers that correspond to addition of one digit numbers is called a **Subtraction fact**.

We can subtract numbers by

1. Use of objects such as sticks/chips/connecting cubes. To subtract 3 from 7, we set aside 7 sticks, take away 3 from these. The count 4 of the remaining ones gives the difference. Therefore $7 - 3 = 4$.
2. Use of lines-To subtract 3 from 7; draw 7 lines |||||, then strike off 3 lines |||++ and count the remaining ones-4, the count of those gives the difference. Therefore $7 - 3 = 4$.
3. Matching objects or drawings. Set aside two collections of 7 objects and 3 objects. Match the objects in two collections and count the objects that are left over in the larger collection. As 4 objects are left over in the collection with 7 objects, the larger collection has 4 more objects or $7 - 3 = 4$
4. Counting back as many digits as the number to be subtracted, the last number gives the difference. For example to subtract 3 from 6 we count back 3 numbers in order 5, 4, 3. The last number 3 gives the difference. Verify $6 - 3 = 3$.
5. Subtraction on number line - to subtract 3 from 6 or find the difference between 6 and 3, we move 6 spaces to the right and land up at 6 on the number line. We then move back 3 spaces to the left. The number 3 where you land up gives the difference of 6 and 3.



6. Use of addition table- as subtraction facts are related to addition facts, for example, if $7 + 5 = 12$, $12 - 5 = 7$. Therefore to find $12 - 5$, we highlight the row with 5 in the row heading and find 12 in that row and read the number at the top of the column, which is 7 and gives the difference of 12 and 5, therefore $12 - 5 = 7$.

Table of addition facts

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

5. Memorizing subtraction facts. This can be aided by some generalizations e.g.
 Subtracting 0 from any number is the number.
 Subtracting 1 from any number gives the number that comes

just before it.

Learning related addition and subtraction facts together.

Fact families

Some facts use the same numbers. They make up a fact family, e.g.

5	8	13	13
+8	+5	− 8	− 5
----	----	----	----
13	13	5	8
----	----	----	----

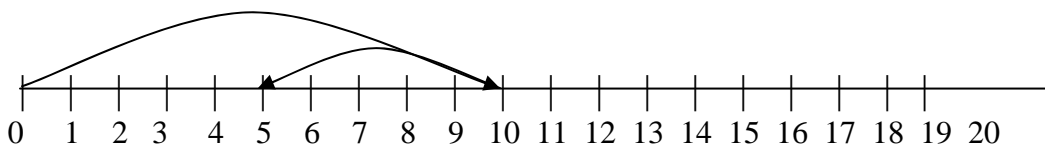
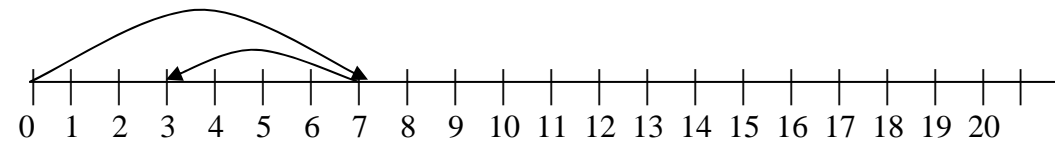
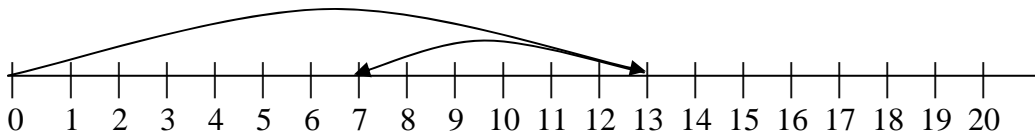
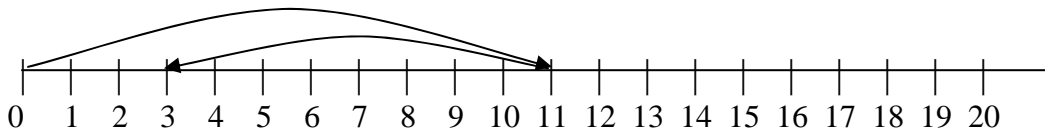
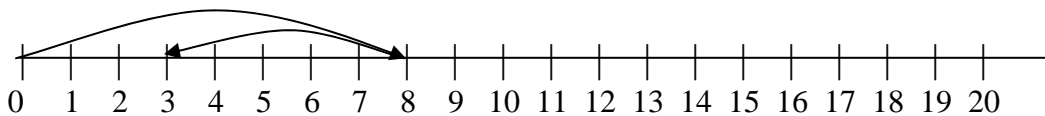
Fact families help us to learn addition and subtraction facts faster.

Checking subtraction

Addition can be used to check whether your subtraction was right, e.g. you could check if $12 - 5 = 7$ is correct by adding the answer 7, in this case to the number that was subtracted namely 5. If the answer is 12 the number from which it was subtracted it was right otherwise wrong.

Exercise 3.1

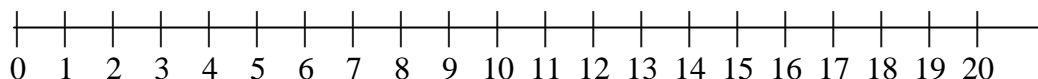
1. Start at 5 on the number line, then hop back 3 steps, what number did you land on?
Show it on number line.
2. How would you find the difference of 3 and 7 using the number line?
3. Write the subtraction statements shown on the following number lines below them:



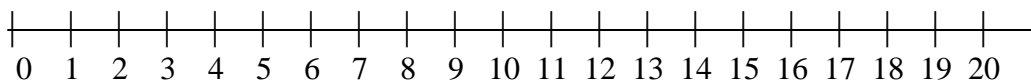
Exercise 3.2

Subtract the following using the number line given below them and write the answer:

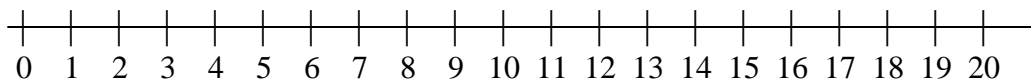
1. $6 - 3 =$



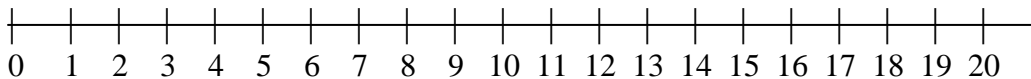
2. $9 - 4 =$



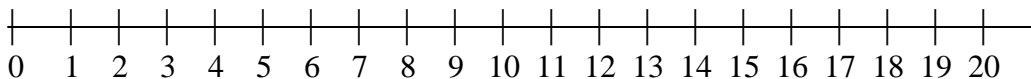
3. $12 - 5 =$



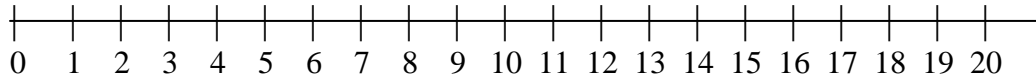
4. $17 - 8 =$



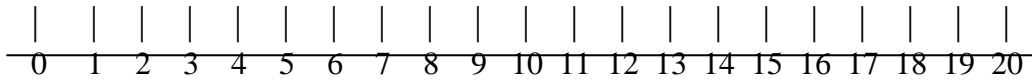
5. $16 - 9 =$



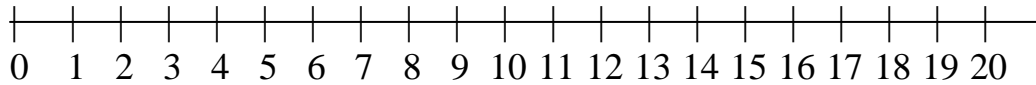
6. $15 - 8 =$



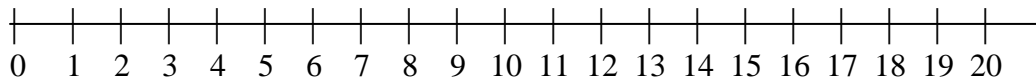
7. $18 - 9 =$



8. $16 - 8 =$



9. $14 - 8 =$



Exercise 3.3

Find the following subtraction facts

1. $7 - 4 =$

2. $8 - 3 =$

3. $10 - 5 =$

4. $12 - 7 =$

5. $15 - 7 =$

6. $17 - 8 =$

7. $16 - 9 =$

8. $18 - 9 =$

9. $13 - 7 =$

10. $12 - 6 =$

11. $14 - 8 =$

12. $15 - 9 =$

13. $17 - 9 =$

14. $16 - 8 =$

15. $14 - 7 =$

Exercise 3.4

Write all the addition and subtraction facts (fact families) for the numbers given below:

1. 3, 5 and 8

$$3 + 5 = 8, 5 + 3 = 8, 8 - 3 = 5, 8 - 5 = 3$$

2. 4, 5 and 9

3. 7, 2 and 9

4. 6, 5, and 11

5. 8, 9 and 17

6. 9, 9 and 18

7. Home assignment

Throw a specific number of coins 10 of the same denomination again and again and record different results in the table given below

Name _____

Number of coins_____

Number of heads	Number of tails	Addition statement

Add number of heads and tails and write these as addition statements e.g.

$$6 + 4 = 10.$$

Hide the number of heads. Can you find the number of tails? If yes, find them and check them.

Exercise 3.5

Solve the following problems orally:

1. Rita had 10 sweets she gave 3 to her brother. How many sweets does she have now?
2. Annu had 6 bangles, 2 were broken. How many bangles does she have now?
3. Runa had 10 rupees her mother gave her 5 rupees. How many rupees does she have now?
4. Gaurav has 5 rupees he wants to buy a book costing 11 rupees. How many more rupees does he need?
5. Sunita has 8 frocks and Sushma has 6 frocks. Who has more frocks and how many more?
6. There were 12 children in a group dance. If there were 7 girls in the dance. How many boys were there?
7. Vimal has 6 toys and his brother has 7 toys. How many toys do they have in all?
8. Rita had 14 rupees she gave 5 rupees to her brother. How many rupees does she have now?
9. There are 7 girls and 16 boys in a class. Are there more girls or boys and how many more?
10. Babita had 12 pencils she lost three of those. How many pencils does she have now?

Mastery test on subtraction facts

Do the Mastery Test on subtraction given below and mark an X on the facts you cannot recall immediately. Find them using any of the methods given earlier and check your answers using the addition table. Memorise these

Subtract

$$\begin{array}{r} 7 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ - 1 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ - 2 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ - 1 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ - 1 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 1 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 9 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 16 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ - 2 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ - 7 \\ \hline \end{array}$$

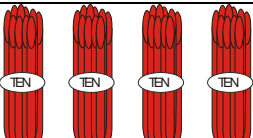
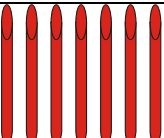
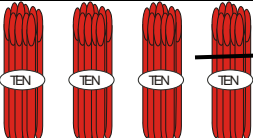
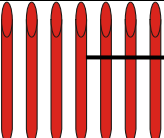
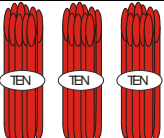
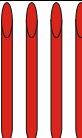
$$\begin{array}{r} 8 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ - 8 \\ \hline \end{array}$$

Subtraction of two-digit numbers that do not require grouping

1. We can subtract two digit numbers by using sticks. For example to subtract 13 from 47, we set aside 4 bundles of ten sticks and 7 single sticks for 47 and remove 1 bundle of ten sticks and 3 single sticks for 13 from these and count the remaining ones.

	Tens	Ones
Set aside 47 sticks		
Remove 1 bundle of ten sticks and 3 single sticks		
Count the remaining sticks = 34 sticks.		

Therefore $47 - 13 = 34$

2. Express the numbers in tens and ones. Subtract the ones from ones and tens from tens.

$$47 = 4 \text{ Tens} + 7 \text{ Ones}$$

$$-12 = 1 \text{ Ten} + 3 \text{ Ones}$$

$$= 3 \text{ Tens} + 4 \text{ Ones}$$

That is the same as 34.

3. Short form

Align the digits in ten's and one's place of the number to be subtracted under the ten's and one's place of the other number. You may write T for Tens and O for Ones above the numbers. Subtract ones from ones and tens from tens.

$$\begin{array}{r}
 \text{T O} \\
 35 \\
 - 12 \\
 \hline
 23 \\
 \hline
 \end{array}$$

Exercise 3.7

Subtract the following by using bundles of hundred-sticks, ten sticks and single sticks:

$$\begin{array}{r} \text{T O} \\ 24 \\ - 13 \\ \hline \end{array}$$

$$\begin{array}{r} 35 \\ - 23 \\ \hline \end{array}$$

$$\begin{array}{r} 49 \\ - 24 \\ \hline \end{array}$$

$$\begin{array}{r} 67 \\ - 40 \\ \hline \end{array}$$

$$\begin{array}{r} 75 \\ - 35 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

$$\begin{array}{r} \text{T.O} \\ 68 \\ - 25 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 95 \\ - 32 \\ \hline \end{array}$$

$$\begin{array}{r} 88 \\ - 45 \\ \hline \end{array}$$

$$\begin{array}{r} 78 \\ - 23 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

$$\begin{array}{r} \text{T.O} \\ 84 \\ - 52 \\ \hline \end{array}$$

$$\begin{array}{r} 78 \\ - 65 \\ \hline \end{array}$$

$$\begin{array}{r} 29 \\ - 16 \\ \hline \end{array}$$

$$\begin{array}{r} 67 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 28 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} \hline \end{array}$$

Exercise 3.8

Subtract the following by first expressing the numbers as tens and ones and subtracting the ones from ones and tens from tens:

1. $47 = \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones}$
 $32 = \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones}$

 $\underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones} = \underline{\quad}$

2. $26 = \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones}$
 $14 = \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones}$

 $\underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones} = \underline{\quad}$

3. $83 = \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones}$
 $63 = \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones}$

 $\underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones} = \underline{\quad}$

4. $54 = \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones}$
 $22 = \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones}$

 $= \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones} = \underline{\quad}$

5. $69 = \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones}$
 $47 = \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones}$

 $= \underline{\quad} \text{ Tens} + \underline{\quad} \text{ Ones} = \underline{\quad}$

Exercise 3.9

Subtract:

$$\begin{array}{r} \text{T O} \\ 39 \\ - 24 \\ \hline \end{array}$$

$$\begin{array}{r} 58 \\ - 14 \\ \hline \end{array}$$

$$\begin{array}{r} 47 \\ - 22 \\ \hline \end{array}$$

$$\begin{array}{r} 27 \\ - 20 \\ \hline \end{array}$$

$$\begin{array}{r} 48 \\ - 5 \\ \hline \end{array}$$

$$\hline$$

$$\begin{array}{r} \text{T O} \\ 55 \\ - 13 \\ \hline \end{array}$$

$$\begin{array}{r} 38 \\ - 23 \\ \hline \end{array}$$

$$\begin{array}{r} 85 \\ - 32 \\ \hline \end{array}$$

$$\begin{array}{r} 7.9 \\ - 16 \\ \hline \end{array}$$

$$\begin{array}{r} 46 \\ - 43 \\ \hline \end{array}$$

$$\hline$$

$$\begin{array}{r} \text{T O} \\ 38 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 55 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 99 \\ - 66 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 89 \\ - 28 \\ \hline \end{array}$$

$$\hline$$

Subtraction of two-digit numbers that requires grouping

Using sticks:

1. Set aside as many sticks as the number from which a number is to be subtracted using ten-sticks and one-sticks.
2. Find the number of ten-sticks and one-sticks in the number to be subtracted.

3. If the number of one-sticks to be removed is less than the number of one-sticks set aside. Remove them.

If the number of one-sticks to be removed is more than the number of one-sticks set aside. Then exchange one ten-stick from ten-sticks with 10 one-sticks and add that to one-sticks. Then remove as many one-sticks as the number of ones.

4. Remove as many ten-sticks as in the number to be subtracted from the ten sticks that are there after exchange.

For example, to subtract 47 from 73,

we set aside 7 ten-sticks and 3 one-sticks for 73 sticks (row 1).

We have to remove 7 one-sticks 4 ten-sticks from these.

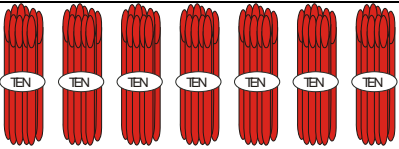

As there are only 3 one-sticks, and we have to remove 7 one-sticks, we

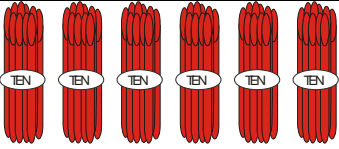
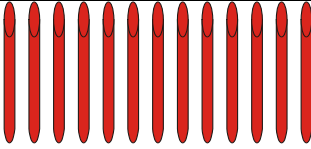
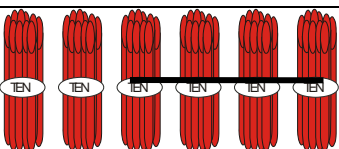
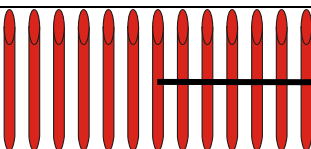
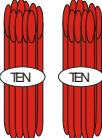
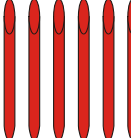
exchange 1 ten-stick from 7 ten-sticks and combine that with 3 one-sticks.

We now have 6 ten-sticks and 13 one-sticks (row 2).

We now remove 4 ten-sticks and 7 one-sticks from these (row 3).

That leaves 2 ten-sticks and 6 one-sticks that is the same as 26 sticks (row 4), therefore $73 - 47 = 26$.

Number	Ten-sticks	One-sticks
Set aside 73 sticks		

Exchange 1 ten-stick with 10 one sticks and combine that with one-sticks		
Remove 4 ten-sticks and 7 one-sticks		
Count the left over sticks-26.		

Using expanded form

- Express the numbers in expanded form.
- If the number of ones to be subtracted is less than the number of ones in the number from which it is to be subtracted, subtract them.

If the number of ones to be subtracted is more than the number of ones in the number from which it is to be subtracted, exchange one ten with 10 ones and add that to ones and correct the number of tens. Then subtract the ones from ones.

- Subtract tens from tens.

For example to subtract 47 from 73, we express 73 in expanded form

$$73 = 7 \text{ tens} + 3 \text{ ones}$$

As we have to subtract 7 ones and there are only 3 ones, we take away 1 ten from 7 tens and rename that as ten ones and add that to 3 ones. So we now have 6 tens and 13 ones and we can now subtract 4 tens and 7 ones from these by subtracting tens from tens and ones from ones.

$$73 = 6 \text{ tens} + 13 \text{ ones}$$

$$-47 = 4 \text{ tens} + 7 \text{ ones}$$

$$2 \text{ tens} + 6 \text{ ones} = 26.$$

Short form

1. Write the numbers aligning ones and tens of the two numbers.
2. We may write T for tens and O for ones above the numbers.
3. If the number of ones to be subtracted is less than the number of ones in the number from which it is to be subtracted, subtract them.

If the number of ones to be subtracted is more than the number of ones in the number from which it is to be subtracted, exchange one ten with 10 ones and correct tens and write 1 before ones to remind us that we have ten + number of ones for ones. Then subtract the ones from ones

4. Subtract tens from tens.

For example to subtract 47 and 73, write 73 and 47 below that aligning one's and ten's places.

As the number of ones to be subtracted is more than 3, we exchange 1 ten with ten ones and correct the tens and ones by striking off 7 and writing 6 and writing 1 before 3 to remind us that we now have 6 tens and 13 ones

We now subtract ones from ones and tens from tens.

T O

61
~~7~~ 3
-4 7

2 6

Exercise 3.10

Subtract the following by using ten-sticks and one-sticks:

T O

-----.

T.O

$$\begin{array}{r} 42 \\ - 14 \\ \hline \end{array}$$

$$\begin{array}{r} 43 \\ - 25 \\ \hline \end{array}$$

$$\begin{array}{r} 49 \\ - 24 \\ \hline \end{array}$$

$$\begin{array}{r} 65 \\ - 47 \\ \hline \end{array}$$

$$\begin{array}{r} 75 \\ - 35 \\ \hline \end{array}$$

$$\begin{array}{r} 63 \\ - 28 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 91 \\ - 36 \\ \hline \end{array}$$

$$\begin{array}{r} 82 \\ - 45 \\ \hline \end{array}$$

$$\begin{array}{r} 72 \\ - 23 \\ \hline \end{array}$$

T.O

$$\begin{array}{r} 84 \\ -15 \\ \hline \end{array}$$

$$\begin{array}{r} 73 \\ -25 \\ \hline \end{array}$$

$$\begin{array}{r} 22 \\ -4 \\ \hline \end{array}$$

$$\begin{array}{r} 63 \\ -48 \\ \hline \end{array}$$

$$\begin{array}{r} 34 \\ -9 \\ \hline \end{array}$$

Exercise 3.11

Subtract the following by expressing the numbers as tens and ones and renaming one ten as ten ones if necessary and subtracting the ones from ones and tens from tens:

$$\begin{aligned} 1. \quad & 42 = 4 \text{ Tens} + 2 \text{ Ones} = 3 \text{ Tens} + 12 \text{ Ones} \\ & -17 = 1 \text{ Ten} + 7 \text{ Ones} = \underline{1 \text{ Ten} + 7 \text{ Ones}} \\ & \qquad \qquad \qquad = 2 \text{ Tens} + 5 \text{ Ones} = 25. \\ & \qquad \qquad \qquad \underline{\hspace{2cm}} \end{aligned}$$

$$\begin{array}{r} 2. \quad 41 \\ - 18 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 82 \\ - 67 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 45 \\ - 19 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 66 \\ - 27 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 71 \\ - 27 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 74 \\ - 47 \\ \hline \end{array}$$

$$\hline$$

$$\begin{array}{r} 8. \quad 32 \\ - 24 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 56 \\ - 29 \\ \hline \end{array}$$

$$\hline$$

$$\begin{array}{r} 10. \quad 35 \\ - 17 \\ \hline \end{array}$$

$$\hline$$

$$\begin{array}{r} 11. \quad 44 \\ - 17 \\ \hline \end{array}$$

$$\hline$$

$$\begin{array}{r}
 12. \quad 57 \\
 \quad -19 \\
 \hline
 \\
 \hline
 \end{array}$$

Exercise 3.12

Subtract:

$$\begin{array}{r} \text{T O} \\ 39 \\ - 24 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ - 18 \\ \hline \end{array}$$

$$\begin{array}{r} 42 \\ - 27 \\ \hline \end{array}$$

$$\begin{array}{r} 25 \\ - 18 \\ \hline \end{array}$$

$$\begin{array}{r} 46 \\ - 28 \\ \hline \end{array}$$

$$\begin{array}{r} \text{T O} \\ 47 \\ - 19 \\ \hline \end{array}$$

$$\begin{array}{r} 35 \\ - 26 \\ \hline \end{array}$$

$$\begin{array}{r} 82 \\ - 35 \\ \hline \end{array}$$

$$\begin{array}{r} 37 \\ - 28 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ - 16 \\ \hline \end{array}$$

$$\begin{array}{r} \text{T O} \\ 73 \\ - 16 \\ \hline \end{array}$$

$$\begin{array}{r} 84 \\ - 36 \\ \hline \end{array}$$

$$\begin{array}{r} 98 \\ - 69 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ - 17 \\ \hline \end{array}$$

$$\begin{array}{r} 66 \\ - 29 \\ \hline \end{array}$$

Exercise 3.13

1. There are 45 children in a class. If there are 26 girls, how many boys are there?
2. Aman bought a book costing 25 rupees. If he gave a fifty-rupee note to the shopkeeper. How much money the shopkeeper would return to him.
3. Raman has 42 rupees and Suman has 23 rupees. Who has more money and how much more?
4. 18 girls and 24 boys went for a picnic. Were there more girls or boys and how many more?
5. Sarah bought two packets of toffees containing 46 and 49 toffees to give to her classmates on her birthday.
How many toffees does she have?

She distributed 88 of those. How many toffees does she have now?

UNIT 4

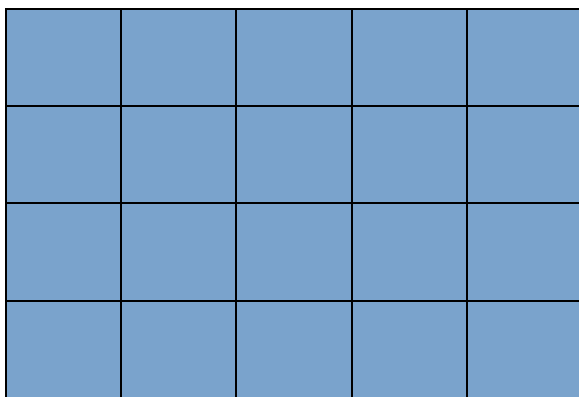
Equal Groups

There are many situations in which we need to add the same number many times. For example,

There are 6 eggs in each carton and we want to know how many eggs are there in 3 cartons.

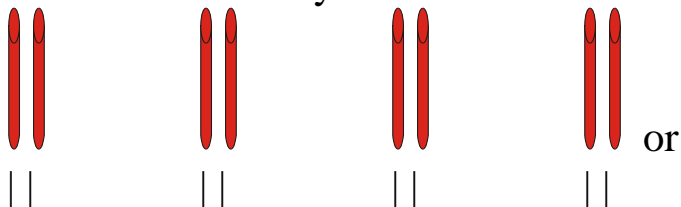
There are $6 + 6 + 6 = 18$ eggs.

Or a rectangular region is covered with small square tiles so there are 5 tiles in each row and there are 4 rows of tiles and we want to find out how many square tiles are there in all.



There are $5 + 5 + 5 + 5 = 20$ tiles.

We set aside 4 sets of two sticks or draw 2 lines 4 times and want to know how many sticks or lines are there in all.



There are $2 + 2 + 2 + 2 = 8$ sticks.

Use of a number line

We can also use a number line to add the same number again and again

Skip counting from a table of Hundred

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

In counting the numbers increase by 1. We can also count by 2's, 3's, 4's...by skipping 1, 2, 3 ...numbers respectively in the hundred table. We will begin with the number.

Skip counting by 2

Highlight every second number up to 20, beginning with 2 and read the highlighted numbers. These are 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20.

Saying these numbers is called skip counting by 2, beginning with 2.

Tell students to repeat it till students are fluent in it.

Skip counting by other numbers

Highlight every fourth number up to 40, and read the highlighted numbers. These are 4, 8, 12, 16, 20, 24, 28, 32, 36 and 40.

Saying these numbers is called skip counting by 4, beginning with 4.

Applications of skip counting

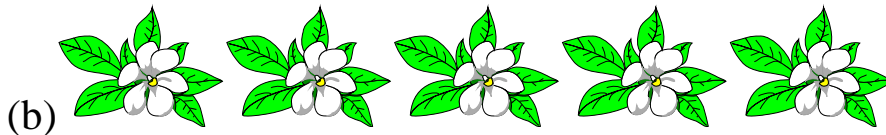
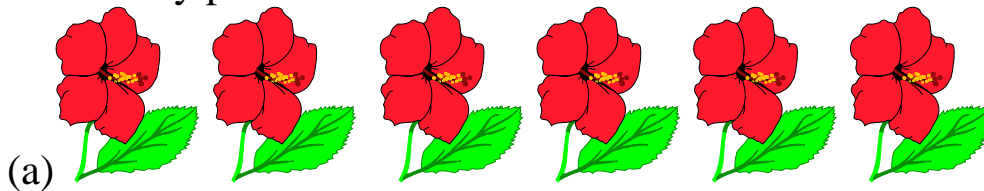
We can use skip counting to add the same number many times.

For example to add $2 + 2 + 2 + 2$, we can count 4 numbers by 2-2, 4, 6, and 8. The last number gives the sum.

Or we have 6 five rupee notes and we want to know how much money we have in all. We can count 6 numbers by 5-5, 10, 15, 20, 25 and 30. The last number gives the amount of money we have.

Exercise 4.1

1. What numbers do you say when you skip count by 2?
2. Count by heart by 2's?
3. What numbers do you say when you skip count by 3?
4. Count by heart by 3's.
5. What numbers do you say when you skip count by 5?
6. Count by heart by 5?
7. What numbers do you say when you skip count by 10's?
8. Count by heart by 10?
9. Highlight every sixth number beginning with 6. Count by 6.
10. How many petals are there in each flower? In all flowers?



11. Make 3 sets of 4 sticks, how many sticks did you need?
12. Make 3 hops of 4 on the number line which number did you land on?

13. Make 4 hops of 5 on the number line what number did you land on?
14. Make 6 hops of 3 on the number line what number did you land on?
15. Make an array of counters or stones with 4 rows and 5 counters in each row, how many counters or stones did you use?
16. Make an array of counters or stones with 6 rows and 3 counters in each row, how many stones did you use?
17. A carpenter needs 4 legs to make a chair, how many legs would he need for 4 chairs?

Making equal groups of objects

Form groups of students having 2, 3, 4, 6, 12 students.

Ask each group to divide 12 sticks among them so that each student in the group has the same number of sticks.

Ask them how many sticks does each student have in groups of different sizes?

Write on the blackboard, the size of the group and number of sticks that each student had in that group.

Repeat it with other number of sticks or other objects using different numbers in each group.

Give each student a specific number of sticks and ask them to give to each student certain number (a factor of that number) and ask them how many students they could give it to?

Repeat with other numbers and objects.

Exercise 4.2

1. Divide the number of sticks given below in as many equal groups as given against each. Write how many sticks are there in each group against each?

4 in 2 _____

9 in 3 _____

20 in 4 _____

30 in 5 _____

70 in 7---

2. Distribute the following number of sticks to students in your class giving each the number of sticks given against them and write against them how many students can have them?

6 sticks giving 2 to each _____

12 sticks giving 3 sticks to each _____

12 sticks giving 4 sticks to each _____

20 sticks giving 5 sticks to each _____

30 sticks giving 6 sticks to each _____

20 sticks giving 10 sticks to each _____

3. If you have 12 toffees and you want to divide equally between 4 friends, how many will each have?
4. If you have 10 laddoos and you want to give 2 laddoos to every one, how many persons can you give it to?
5. If a frog starts on a number line at 20 and hops back 5 steps at a time in how many hops he would reach 0 on number line?
6. If a frog starts on a number line at 12 and hops back 4 steps at a time in how many hops he would reach 0 on number line?
7. Make an array of 20 counters or stones with 4 rows, how many counter or stones will be in each row?
8. Make an array of 24 counters or stones with 6 rows, how many counter or stones will be in each row?
9. Use 12 counters and keep 3 stones in each row, how many rows of counters would be there?
10. Use 16 counters and keep 4 stones in each row, how many rows of counters would be there?

UNIT 5

Geometry

Shapes

Activity 5.1

Give an assortment of triangles, squares, circles rectangles and parallelogram to students and ask them to sort similar shapes in different piles.

The shapes in each pile have a special name.

Square

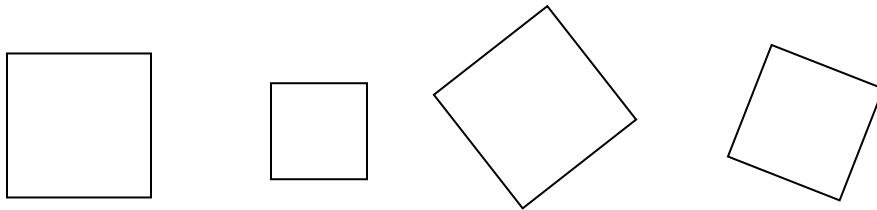
Show them a model of a square.

Show a side of the model of a square and ask them to show other sides.

Show a corner of the model of a square and ask them to show other corners.

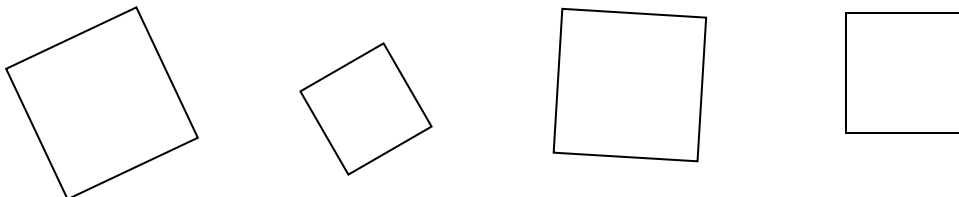
Ask them to draw a square with the help of a model of a square.

This shape is called a square. Some more examples of a square are given below



Trace and cut these. Rotate these squares and trace them again.

These are some of the tracings of a square after rotation.



These are all squares.

How many sides and how many corners does a square have?

Are lengths of different sides the same?

Do all the corners have the same shape?

Rectangle

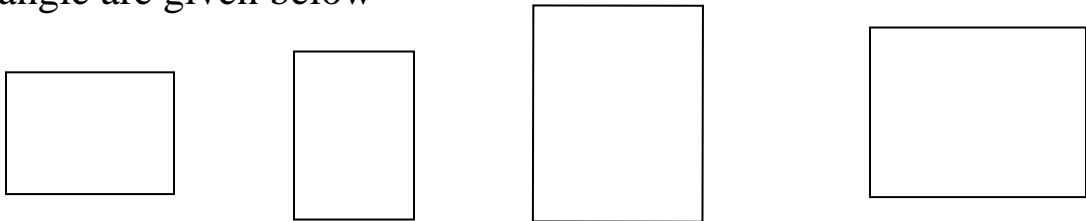
Show them a model of a rectangle.

Show a side of the model of a rectangle and ask them to show other sides.

Show a corner of the model of a rectangle and ask them to show other corners.

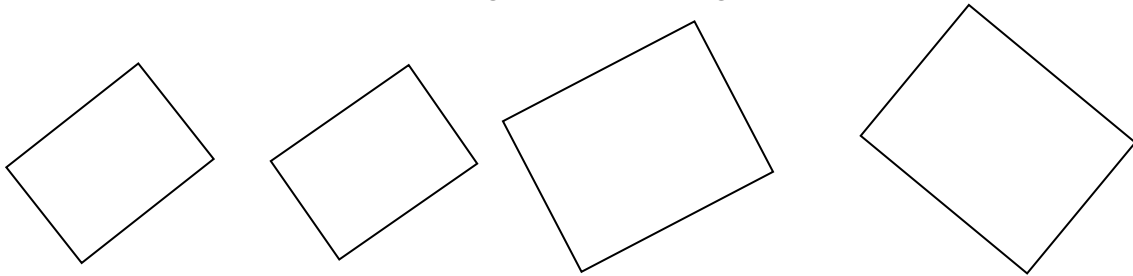
Ask them to draw a rectangle using model of a rectangle.

This shape is called a rectangle. Some more examples of a rectangle are given below



Trace and cut these. Rotate these rectangles and trace them again.

These are some of the tracings of a rectangle after rotation.



These are all rectangles.

How many sides and how many corners does a rectangle have?

Are lengths of different sides the same?

Do all the corners have the same shape?

Triangle

Show them model of a triangle all whose sides are of different length.

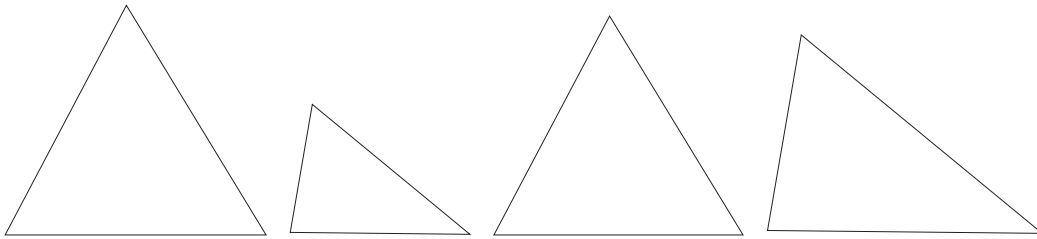
Show a side of the model of a triangle and ask them to show other sides.

Show a corner of the model of a triangle and ask them to show other corners.

Ask them to trace a triangle.

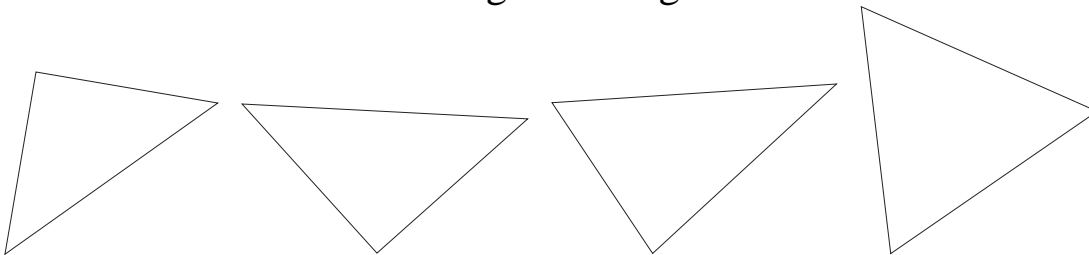
This shape is called a triangle.

These are some of the figures of a triangle:



Trace these triangles and cut them. Rotate the cut triangles and trace them again.

These are some of the tracings of triangles after rotation.



All of these are also triangles.

How many sides does a triangle have?

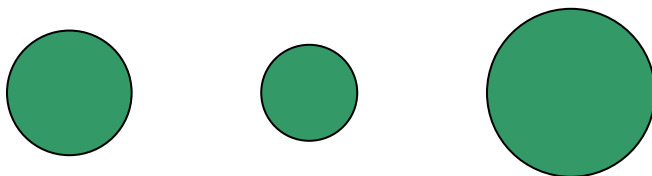
How many corners does a triangle have?

Are the lengths of all sides in a triangle necessarily of the same length?

Do all the corners in a triangle necessarily have the same shape?

Circle

Show them a model of a circle



What do you notice about this shape?

How does it differ from other shapes we have studied?

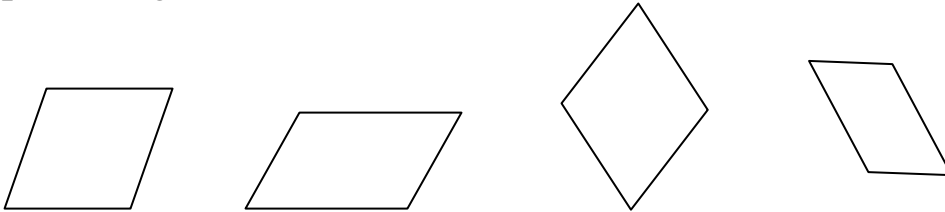
Parallelogram

Show them a model of a parallelogram.

Show a side of the model of a parallelogram and ask them to show other sides.

Show a corner of the model of a parallelogram and ask them to show other corners.

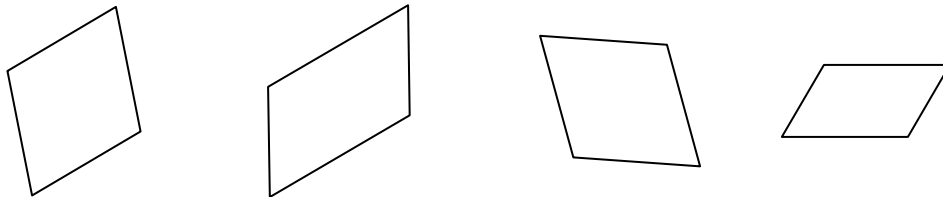
Ask them to trace the parallelogram. This is called figure of a parallelogram.



All of these are parallelograms.

Trace these and cut them. Rotate the cut parallelograms and trace them again.

These are some of the tracings of parallelograms after rotation.



All of these are also parallelograms.

How many sides does a parallelogram have?

How many corners does a parallelogram have?

Are the lengths of all sides in a parallelogram necessarily of the same length?

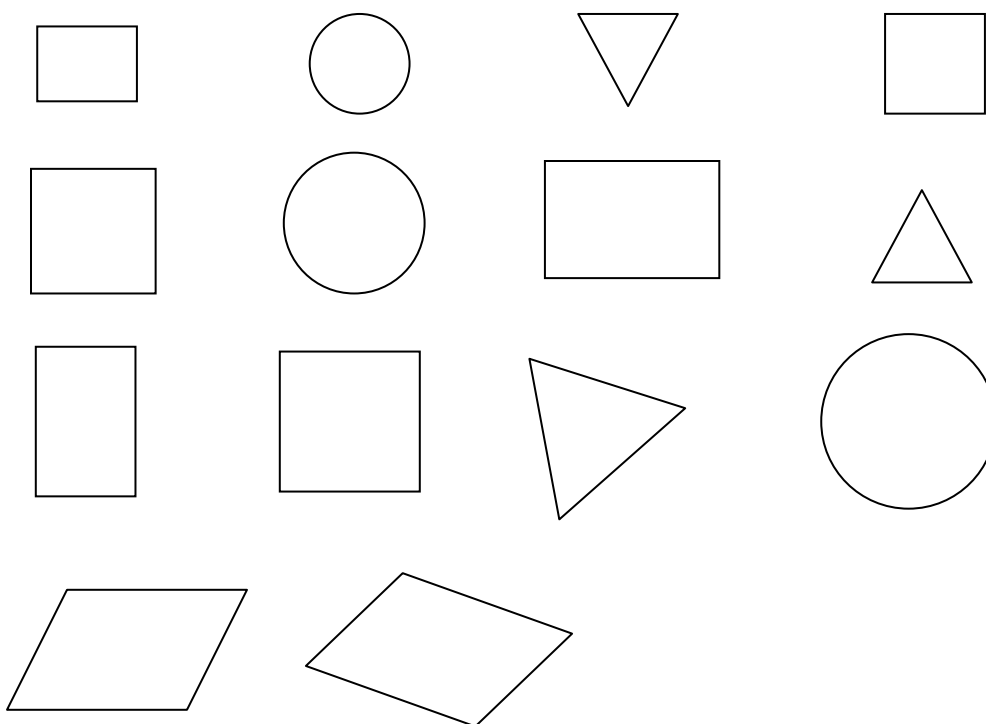
Do all the corners in a parallelogram necessarily have the same shape?

Exercise 5.1

1. Write the name the shapes given below them:



2. Colour the circles green, squares red, rectangles yellow, parallelograms black and triangles blue.



3. Cut the shapes in Activity Sheet 5.1
Paste the squares in the chart given below.

--	--	--	--	--

4. Paste the rectangles in the chart given below.

--	--	--	--	--

5. Paste the triangles in the chart given below

--	--	--	--	--

6. Paste the circles in the chart given below.

--	--	--	--	--

7. Paste the parallelograms in the chart given below.

--	--	--	--

8. Draw a circle with the help of a coin, bangle or any other circular object.
9. Make a square, a rectangle, a parallelogram and a triangle using small sticks, toothpicks or matchsticks.
10. Name 3 objects which have the same shape as a
Triangle
Square
Rectangle
Circle
Parallelogram
11. How are a square and rectangle similar?
12. How are a square and rectangle different?
13. How are a rectangle and a parallelogram different?
14. Make triangles on a Geoboard.
15. Make squares on a Geoboard.
16. Make rectangles on a Geoboard.
17. Make parallelograms on a Geoboard.
18. Copy a triangle on a Geoboard so that it has the same size and shape as that of the student sitting next to you.
19. Copy a square on a Geoboard so that it has the same size and shape as that of the student sitting next to you.
20. Copy a rectangle on a Geoboard so that it has the same size and shape as that of the student sitting next to you.
21. Copy a parallelogram on a Geoboard so that it has the same size and shape as that of the student sitting next to you.

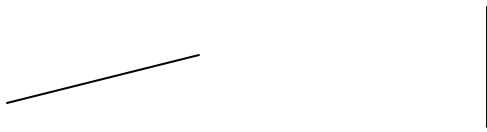
Straight and Curved lines

Activity 5.2

Let two children hold a thin rope loosely; this is a model of a **curved line**.

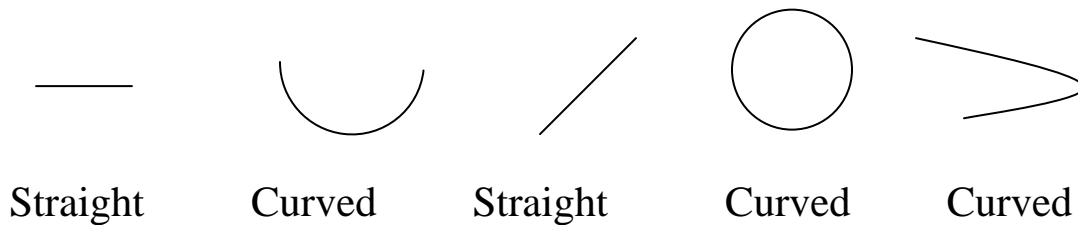
Now ask them to stretch it tightly; this is a model of a horizontal **straight line**.

Show them models of slant and vertical lines by holding a rope tightly

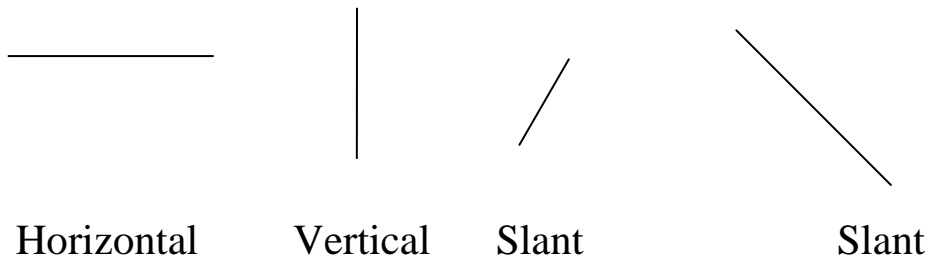


Ask students to show models of curved, straight lines in horizontal, vertical and slant positions by holding a rope.

Examples of straight and curved lines are given below:



Straight lines may be in horizontal, vertical or slant positions



Exercise 5.2

1. Show models of straight lines in horizontal, vertical, slant positions by folding a paper.
2. Draw horizontal, vertical and slant lines by using a ruler and label them.
3. Make free hand drawings of horizontal, vertical and slant lines and label them.
4. Label different sides as horizontal, vertical or slant by writing H or V or S along the sides in the following figures:
5. Make horizontal, vertical slant and curved lines on a Geo Board.
6. Give examples of horizontal, vertical and slant lines in your surroundings.

Three dimensional (3-D) figures

Sorting of space figures

Activity 5.3

Ask students to bring objects like small boxes, cans, balls, funnels and so on and ask them to sort these objects into groups so that all objects in a group have the same shape.

Activity 5.4

Pictures of some objects are given in Activity Sheet 6.2. Cut and paste these objects in the following table so that all objects in a row have the same shape.

Activity 5.5

Show them physical models of a sphere, cube, cuboid, cylinder and cone.

Ask them to identify the objects they had earlier brought from home as models of a sphere, cube, cuboid, cylinder and cone.

Exercise 5.3

1. Name some objects in your surroundings that have the shape of
a
cube
cuboid
cone
cylinder
sphere
2. Which of these three-dimensional figures would roll?
3. Which of these three-dimensional figures would stack?
4. Which of these three-dimensional figures can be used for making walls (remember a wall cannot have holes)?

Identification and properties of space figures

Activity 5.6

Give students physical models of cube, cuboid, cone, cylinder and sphere and Show a face, corner and edge of each of these space figures. Then ask students

1. Show other faces, corners and edges of each of these
2. How many of faces, corners and edges does each of these have?
3. Tell for all faces of each of the models whether a face is a plane surface or curved surface
4. Keep the plane surfaces of the solids on a paper and trace these with a pencil. These are called plane figures.

Name these.

Activity 5.7

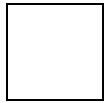
Make models of cube, cuboid, cone and sphere with Styrofoam or clay.

If you keep these on your desk and cut horizontally, guess what would be the shape of the cross section and verify it.

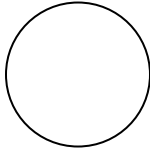
If you keep these on your desk and cut with a slant, guess what would be the shape of the cross section and verify it

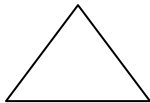
Exercise 5.4

1. Name the space figure or figures that have one or more faces of the shapes given below and write them against the shapes.



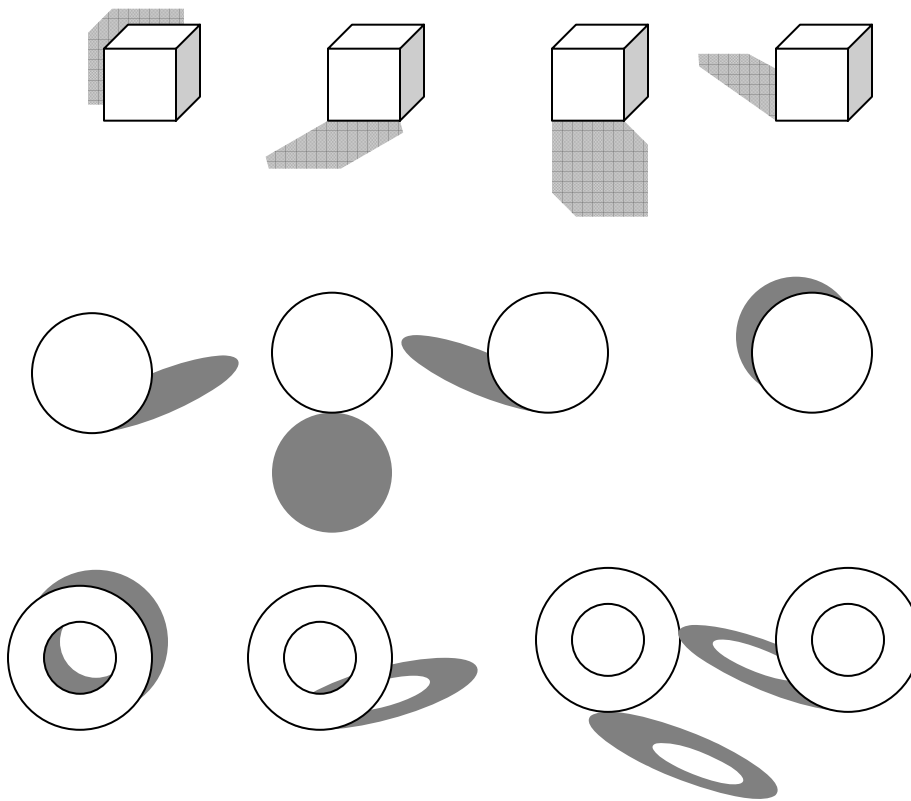






Shadows of Objects

You all must have seen your own shadow and that of other objects. They vary in shapes and size. Some of the shadows cast by different objects are shown below:



Activity 5.8

Take the students outside at a time say between 11 a.m. and 1 o'clock when the shadows are small. Find a place where students can spread out on an area of concrete and ask them where their shadows are? Can everyone find his or her own shadow? Where is it? Is everyone's shadow visible?

How are shadows made, then?

Where is the Sun? Where is your shadow? Then ask them to face the Sun, turn to the left and turn to right and see where the shadow is in each of these positions?

What is true then about shadows and the Sun? (Shadows point away from the Sun.)

Drop a small object somewhere. Where is your shadow? Can you move your shadow so that the shadow of your hand can cover the little object on the ground? How did you know where to put your hands? (The sunlight is in straight lines to their hands and by lining themselves up with the Sun and the object; they can cast a shadow on it.)

In the class teacher can demonstrate by a light source

The length of the shadow cast by an object depends on the height of the tilted light source and the size of the object it is illuminating.

For more on shadows go to

<http://hea-www.harvard.edu/ECT/Shadow/shadow.html#intro>

UNIT 7

Money

We use money for buying things, paying bus fare, paying school fees among other uses. Indian money is in **rupees**. The worth of a note or coin is called its **denomination**. Currency of denomination of rupees 1, 2 and 5 is available in notes as well as coins. The coins and notes of various denominations up to Rupees 100 are given below:

Coins and notes of different denominations







Finding the worth of notes of several denominations

If we have some ten-rupee notes we can find the amount of money we have by counting by ten as many times as the number of ten-rupee notes. The last number gives the amount of money we have. For example, if we have 6 ten-rupee notes, we can count 6 numbers by ten-10, 20, 30, 40, 50 and 60 as the last number is 60 we have 60 rupees.

If we have some five-rupee notes we can find the amount of money we have by counting by five. For example, if we have 5 five-rupee notes, we can count 5 numbers by five-5, 10, 15, 20 and 25 as the last number is 25, we have 25 rupees.

If we have some two-rupee notes, we can find the amount of money we have by counting by two. For example, if we have 6 two-rupee notes, we count six numbers by two-2, 4, 6, 8, 10 and 12 as the last number is 12, we have 12 rupees.

If there are several notes of different denominations we can find the amount of money by first finding worth of notes of the same denomination separately and then adding them. For example, if we have 6 ten-rupee notes and 5 five-rupee notes, we first find the worth of 6 ten-rupee notes which is equal to 60 rupees, then the worth of 5 five-rupee notes which is equal to 25 rupees and then

add them. As $60 \text{ rupees} + 25 \text{ rupees} = 85 \text{ rupees}$, therefore the total amount of money is equal to 85 rupees.

Paise

We also have coins of smaller denomination in paise. One rupee is the same as 100 paise. The coin used to come in the denomination of 1 paise, 2 paise, 5 paise, 10 paise, 20 paise, 25 paise and 50 paise, however now only 50-paise coins are in use that too at very few places. (Show a 50 paise-coin.) But the prices of things of daily use can involve paise other than 50.

Exercise 7.1

1. If you have the set of notes given below, how much money would you have?

8 one-rupee notes

5 two-rupee notes

6 five-rupee notes

8 ten-rupee-notes

6 ten-rupee-notes, 2 five-rupee notes and 7 one-rupee notes

2 ten-rupee notes and 5 one-rupee notes

2 ten-rupee-notes, 1 five-rupee notes and 3 one-rupee notes

2. How many ten-rupee notes can you get for a hundred-rupee note?
3. How many five-rupee notes can you get for a ten-rupee note?
4. How many two-rupee notes can you get for a ten-rupee note?
5. How many paise does a rupee have?

6. How many fifty-paisa coins does a rupee have?
7. Rani has coins worth 17 rupees in her purse. What combination of coins she can have? (There are many correct answers.)

UNIT 8

Time

We need to know time for going to school or office, seeing a TV programme or a movie etc. All of these begin at a fixed time.

Tell time at which the following begin:

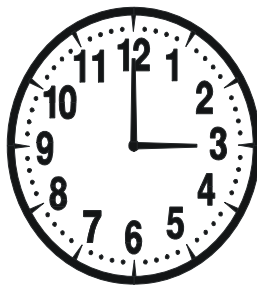
Your favorite TV programme

Your school

Suggest some other times during the day when you would like to know the time.

A clock helps us to find out what time it is?

The face of a clock is given below:



It is marked with numerals 1 to 12. It has two hands. The shorter hand is the **hour hand** and the longer hand is the **minute hand** and their position tells us the time.

The hands always move in the same direction. The direction in which the hands move is called **clockwise** direction. The opposite direction is called **counterclockwise** direction.

The hour hand takes one hour to move from one numeral to the next.

The minute hand takes 5 minutes to go from a numeral to the next numeral or 60 minutes or one hour to come back to the same numeral.

A clock shows 12 o'clock both at noon and mid-night.

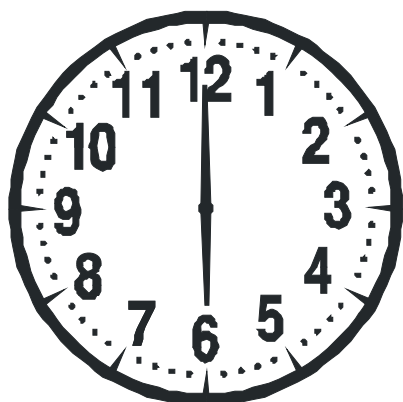
The duration of the time from one mid-night to next mid-night forms a day.

A day has 24 hours.

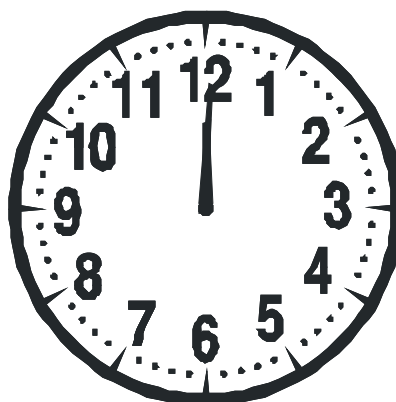
Reading time from a clock

Minute hand points to a 12

When the minute hand is at 12 the hour hand points exactly to a numeral, say 3 as in the clock above the time is 3 o'clock. If the minute hand is at 12 and hour hand points to 6, the time is 6 o'clock. When both the minute hand and hour hand are at 12 the time is 12 o'clock.



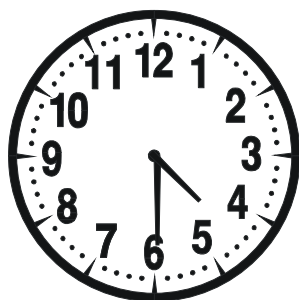
6 o'clock



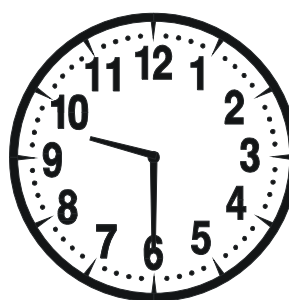
12 o'clock

Minute hand points to a 6

When the minute hand points to 6 the hour hand is halfway between two numerals. The time is half past the smaller number. For example, if the hour hand is halfway between 4 and 5 and the minute hand is at 6 as in the clock given below the time is half past four.



Half past four

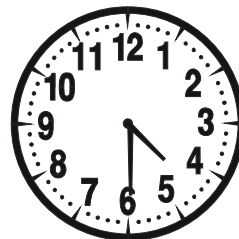
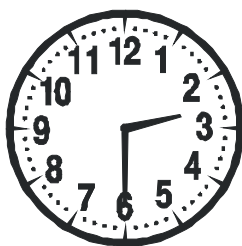
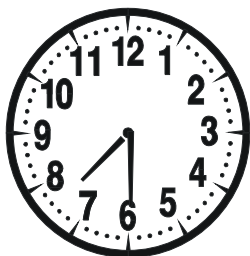
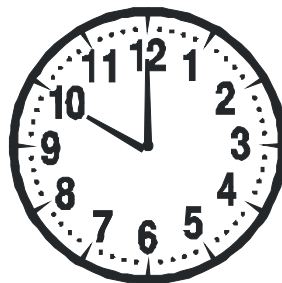
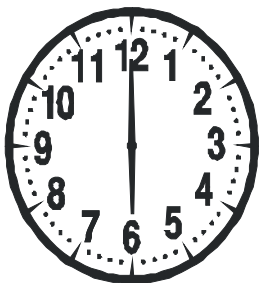
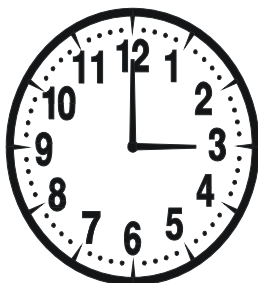


Half past Nine

Similarly if the hour hand is between 9 and 10 and the minute hand is at 6 as in the clock given below the time is half past nine.

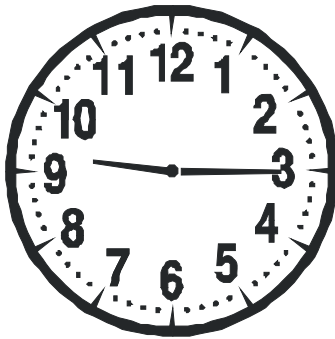
Exercise 8.1

Read the time shown on each clock and write it in the box given below it.

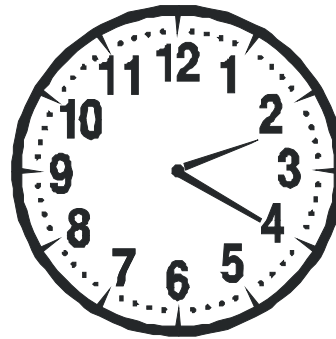


Minute hand points to a number other than 6 or 12

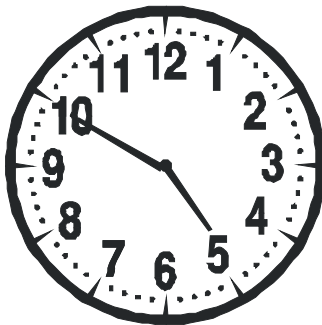
If the minute hand points exactly to a number other than 6 or 12, we can find time by looking at the numeral to which the minute hand points to and counting by five as many numbers as the numeral beginning with one. For example, in the first clock the minute hand is at 3 so we count 3 numbers by five-5, 10 and 15, the time then is 15 minutes past the numeral after which the hour hand points to in this case 9. Verify the time on other clocks is as given below them. Note that 30 minutes past three is the same as half past three.



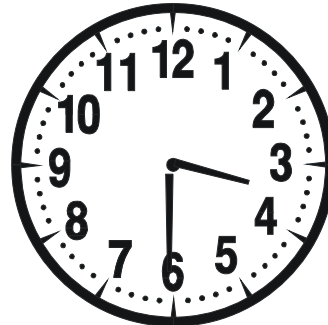
15 minutes past nine



20 minutes past two



50 minutes past four



30 minutes past three

Days, months and year

Time keeps passing. Each day is followed by another day. The time of a particular event e.g. birth, death is specified by the day, month and year. The day Christ the founder of Christian religion was born is taken as first day of year zero in present numbering of years. The years before that are counted as so many years before Christ. The month and days in a year are as follows:

There are 12 months in a year.

January is the first month of the year and has 31 days.

February is the second month of the year and has 28 or 29 days.

March is the third month of the year and has 31 days.

April is the fourth month of the year and has 30 days.

May is the fifth month of the year and has 31 days.

June is the sixth month of the year and has 30 days.

July is the seventh month of the year and has 31 days.

August is the eighth month of the year and has 31 days.

September is the ninth month of the year and has 30 days.

October is the tenth month of the year and has 31 days.

November is the eleventh month of the year and has 30 days.

December is the twelfth month of the year and has 31 days.

Days in each month begin with 1 and increase by one till the number of days it has.

A year begins with first day of January and ends with 31st of December.

It has 365 or 366 days.

After December, January of next year would come and the other months would follow in the same order.

Learn the poem given in Appendix 1.

A day is specified by day, month and year and is called the **date**.

It is important to know the date when an event took place e.g. when a person was born, when a letter was written. We write a date as 7.4.2004 or 7th April, 2004.

Calendar

Show a calendar of the current year.

A calendar shows months of a year and days in a month.

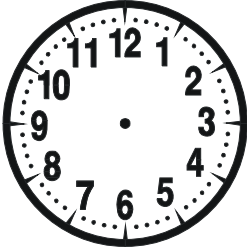
A calendar also shows there are 7 days in a week- Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday and these are followed again by these days in order in the next week.

A calendar is helpful in finding the days of the week on which a particular day would fall or the date on which first Sunday would fall. Can you suggest some situations in which you would want to know these?

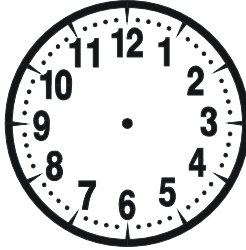
Give examples of dates of important festivals and demonstrate how to find the day of the week for these from a calendar; and the day of the month on which first Sunday or last Saturday of a month would fall.

Exercise 8.2

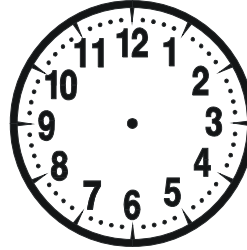
Draw the hour hand and minute hand on the face of the clocks to show the time given below them:



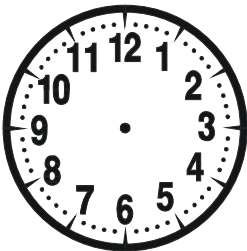
3 O'clock



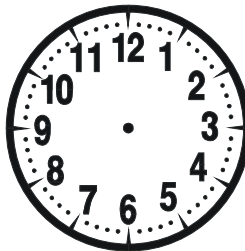
9 O'clock



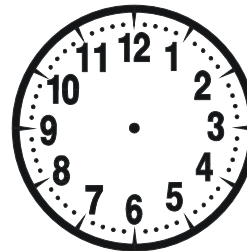
4 O'clock



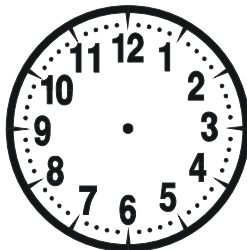
Half past four



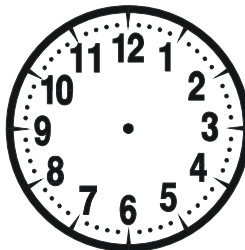
Half past eight



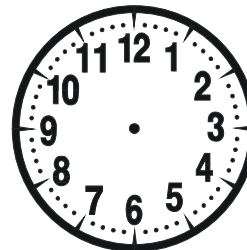
Half past ten



Half past six



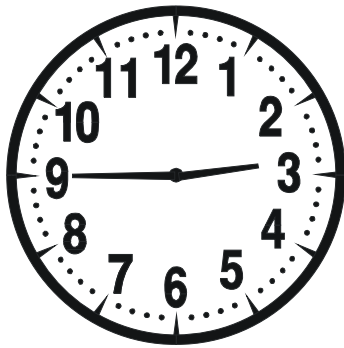
12 O'clock



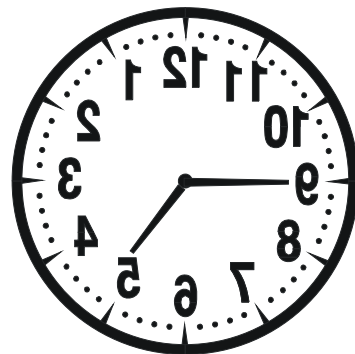
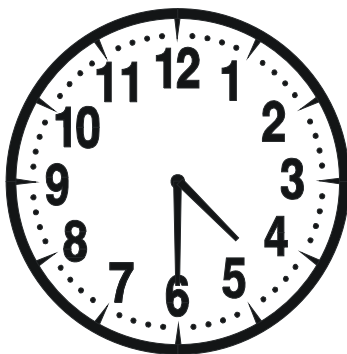
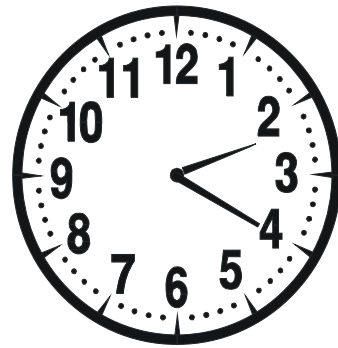
Half past nine

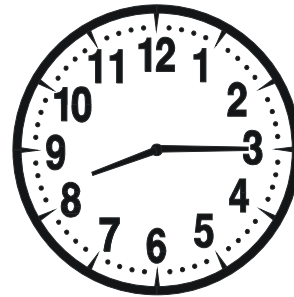
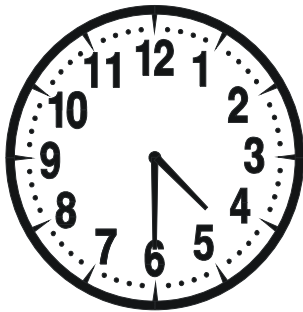
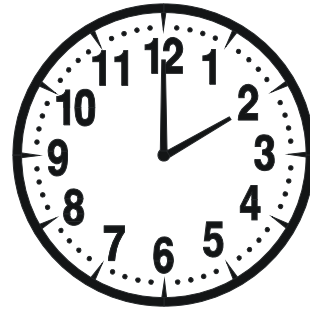
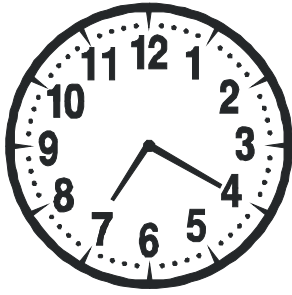
Exercise 8.3

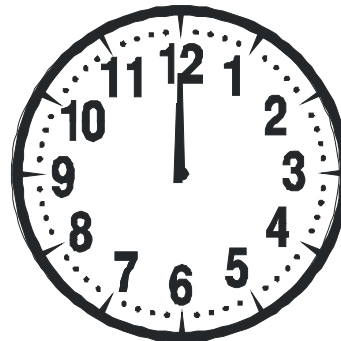
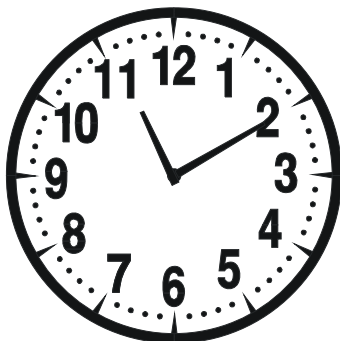
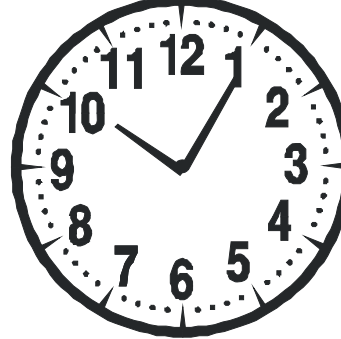
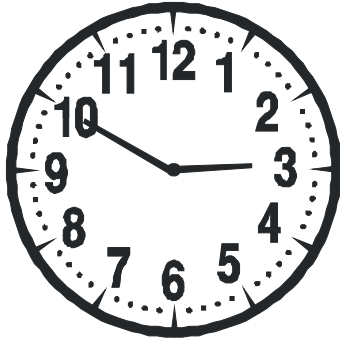
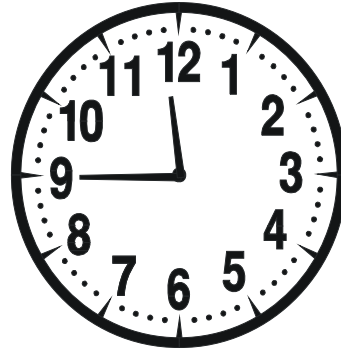
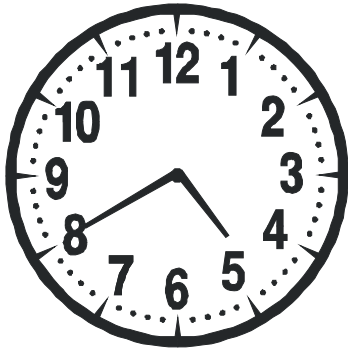
Write the time shown on the clocks in the box given below them:



45 minutes past two







Exercise 8.4

1. How many minutes are there in an hour?
2. How many hours are there in a day?
3. How many days are there in a week? Name the days of the week in order beginning with Sunday.
4. How many months are there in a year? Name the months of a year in order.
5. Fill in blanks
March is the ____third____month of the year.
June is the _____month of the year.
November is the _____month of the year.
December is the _____month of the year.
6. Name the second month of the year.
Name the eighth month of the year.
Name the tenth month of the year.
7. Write the date today.
8. Write the date 5.7.2004 in a different way.
9. On which day or days is your school closed?
10. Which day of the month is the second Saturday of March?
11. Mahatma Gandhi's birthday is on second October. Find the day of the week on which it would fall this year.

12. When is your birthday? Find the day of the week on which it would fall this year.
13. Where do you find dates written in your surroundings?

APPENDIX 1

Poem on the number of days in a month

Thirty days has September,
April, June and November.
All the rest have thirty-one,
Except for February alone,
which has twenty-eight days clear
and twenty-nine in each leap year.

UNIT 8

Measurement

Length

Ordering objects in order of length

Take out a pencil, a pen, and a crayon from your school bag and tell

1. Which of these is the shortest?
2. Which of these is the longest?
3. Are any two of these about the same length?
4. If you arrange these objects in order of length from smallest to largest, then which objects would you place at first, second and third position?
5. If you arrange these objects in order of length from largest to smallest, then which objects would you place at first, second and third position?

Ordering objects in order of width

The shorter side of a rectangular object is called its **width**.

Take out a rubber, a scale, mathematics book, and mathematics notebook from your school bag and tell

1. Which object is the widest?
2. Which object has least width?
3. Are any of these objects about the same width?
4. If you arrange these objects in order of width from smallest to largest, which objects would you place at first, second, third and fourth position?
5. If you arrange these objects in order of width from largest to smallest, which objects would you place at first, second, third and fourth position?

Ordering objects in order of height

Ask 4 children to come to the front and asks others

1. Who is taller child A or child B (name the two children).
2. Who is shorter child A or child B (name the two children).
3. Are any of these children about the same height?
4. Where would child C (name him) would fit in if he and children A and B were to stand in order of height from shortest to tallest?
5. Where would the child D fit in (name him)?
6. If these four children were to stand in order from shortest to tallest, name the child who should stand first, second, third and fourth.
7. If these four children were to stand in order from tallest to shortest, name the child who should stand first, second, third and fourth.

Need for standard units

1. Cut a strip of paper or cardboard that is as long as your little finger, call this “chichi”.
How many chichis long is your mathematics book?
How many chichis long is your pen?
How many chichis long is your nose?
2. Cut a larger strip of paper and make a ruler by marking it at distances equal to a chichi and numbering them as 0, 1, 2, 3, 4,.....in order.
Tell the length, width and height of your desk, length, width and thickness of your math’s book using the ruler.
Are our numbers the same?
Since we are all measuring the same things, why are our numbers not the same?
3. Use sticks of the same length (given or specified by the teacher) and measure again length, width and height of their desk, length and width of your math’s book. Are our numbers about the same now?

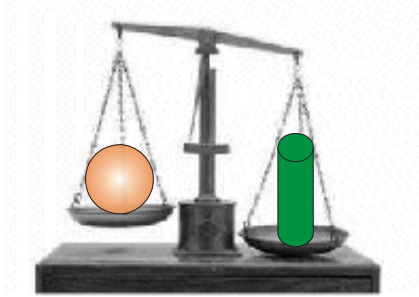
Exercise 8.1

1. Find something in the classroom that is wider than your desk.
2. Find something in the classroom that is shorter than your pencil.
3. Find some things that are about the same length.
4. Which is farther from your classroom, Principal's room or library?
5. Who is farther from the blackboard (name 2 children)?
6. Which is nearer from our school (name 2 places all the children are familiar with)?
7. Name a far away place that you have been to.
8. How can we measure length of this room using our foot?
9. Measure and tell the length of your classroom using your foot.
10. Why do your measurements of different children differ?
11. What are some other materials or objects that we could use to measure length?
12. Arrange 4 sticks of different length in order.
13. Find one-half the length of a given piece of yarn?
14. Find one-fourth the length of a piece of yarn?

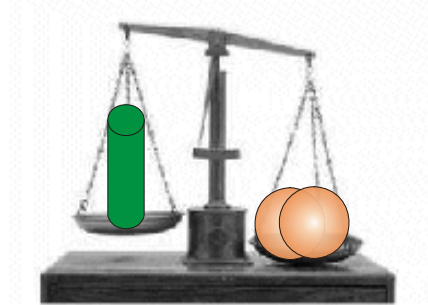
Weight

Ask students to take out two objects of different weight from their school bag, one in each hand and ask the student to tell which one weighs more and which one weighs less. How did they determine which weighed more and which weighed less. The one that weighs more is called **heavier** and the one that weighs less is called **lighter**.

You can also tell what weighs more by using a balance. The side of the balance with heavier objects goes down.



Cylinder is heavier than the sphere

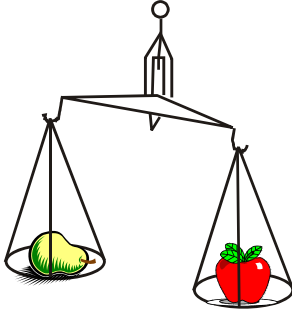


One cylinder is lighter than two spheres

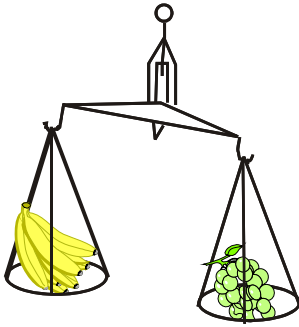
We can weigh and compare weight of objects by using marbles of the same size till both sides balance. The number of marbles required for both pans to be at the same level is the weight of the object. The object that requires more marbles is heavier. How much one object is heavier than the other can be determined by the difference in the number of marbles. Demonstrate by weighing readily available objects.

Exercise 8.2

1. Give examples of situations that require measurement of weight.
2. Tell which of the two objects is heavier? How did you find out?



3. Tell which of the two objects is lighter? How did you find out?



4. Does the size of an object always determine how much it weighs?
5. Give examples of small objects that weigh a lot.
6. Give examples of large objects that do not weigh a lot.
7. How can we determine how much an object weighs?
8. Have you seen other scales? Describe them.

Capacity

Ordering objects in order of capacity

Ask children to bring empty bottles, plastic mugs etc. and ask them which of two specific containers would contain more?

Which of two specific containers would contain less?

Would any of these containers contain about the same amount of water?

The quantity of liquid a container can hold is called its **capacity**.

We can compare the capacity of two containers by filling one container with water and pouring it in the other, if the second is full and some water is left over in the first, the first one has more capacity. On the other hand if we can pour all the water and second one is still not filled then the first one has less capacity. If the second is also full and no water is left over, both have the same capacity. We can estimate the capacity of a big container by pouring mugs of water till it fills and counting the number of mugs needed to fill it. We can also compare the capacity of two containers by this procedure. The container that needs larger number of mugs has more capacity

Exercise 8.3

1. Arrange three containers such as a glass, a bowl and a pot in order of capacity and verify that.
2. Compare the capacity of the containers given below by writing S under the smallest, L under the largest.



3. How can we determine the capacity of any container say a bucket using mugs?
4. Find the capacity of some bigger containers using smaller containers.

5. Estimate the capacity of some other containers in terms of a specific container and verify those.
6. Would using bowls rather than mugs to measure the capacity of a bucket give us the same answer? Why or why not?

UNIT 9

Organize and display data.

Ask students to cut squares with different animals in Activity Sheet 9.1 and paste these in columns so that each column has a unique property. When all the animals are pasted, ask students

1. How many columns of animals are there?
2. What names would you give to different columns?
3. Write the names in the first row at the top of the column.
4. How many animals are in different columns?
5. Which column has the largest number of animals?
6. Which column has the smallest number of animals?

Collection and Presentation of measurement Data

Ask a few children whose heights differ to come in front, and then ask the following questions to all the children:

1. Who is the shortest in the group?
2. Who is the tallest in the group?
3. Are there any children who are of the same height?
4. If we want to form a queue in order of height, which child should be in the first position, which child should be in second position and so on?

Repeat with other groups of different number of children beginning with 4.

Repeat with sticks or other objects of different lengths.

Exercise 12.1

Cut vertically the pictures of rods along the lines given in Activity Sheet 9.1 and arrange them in order of length in Activity Sheet given below:

--	--	--	--	--	--

Cut vertically the pictures of pencils along the lines given in Activity Sheet 9.2 and arrange them in order of length in Activity Sheet given below

--	--	--	--	--	--

UNIT 10

Patterns

Activity 10.1

Show some patterns such as ABABAB... ABBABBABB...

ABCABCABC... on the blackboard or charts and ask students to describe it and what would come next?

Make patterns with blocks, chips or leaves of different shapes, sizes, and colours and ask them to describe them.

Copy and extend the patterns made by others.

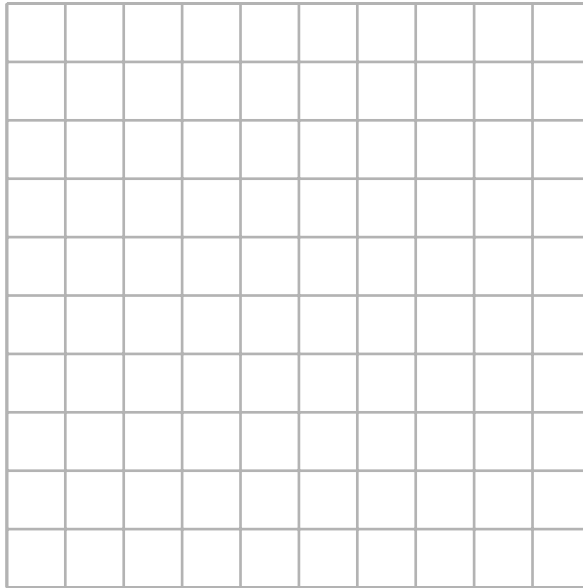
Activity 10.2

Cut the shapes given in Activity Sheet 1 and make patterns with those Describe them.

Copy and extend the patterns made by others

Activity 10.3

In the grid given below make patterns by using crayons of different colours



Describe them.

Copy and extend the patterns made by others.

Activity 10.4

Find patterns in your surroundings (Clothing, borders of saris, furnishings, wrapping paper, calendar) show and describe them in class.

Activity 10.5

In a hundred table given in Activity Sheet 2

What pattern do you notice in each row?

What pattern do you notice in each column?

How are the patterns in different rows the same?

How do the patterns in different rows differ?

How are the patterns in different column the same?

How do the patterns in different columns differ?

Activity 10.6

Use a table of hundred to create some number patterns (by shading every second, third, fourth...number and starting with highest or lowest).

Describe the pattern.

Activity 10.7

Note the pattern in each of the following series of numbers. Write the next number using the pattern.

1, 3, 5, 7, ____

6, 9, 12, 15, ____

7, 6, 5, 4, ____

6, 8, 10, 12, ____

5, 10, 15, 20, ____

50, 60, 70, 80, ____

10, 8, 6, 4, ____

20, 19, 18, 17, ____

14, 12, 10, 8, ____

4, 8, 12, 16, ____

45, 46, 47, 48, ____

26, 36, 46, 56, ____

Activity 10.8

For the addition table given in Activity Sheet 3

Write the numbers in the first row.

How the numbers in the row beginning with 0 differ from numbers in the first row.

What does that mean? (Hint-Any number + 0 = the number).

How the numbers in the row beginning with 3 differ from numbers in the first row. (These are 3 more than the numbers in the first row)

How the numbers in the row beginning with 7 differ from numbers in the first row?

How the numbers in the row beginning with 8 differ from numbers in the first row?

Write the pattern in the diagonal cell. Describe the pattern.

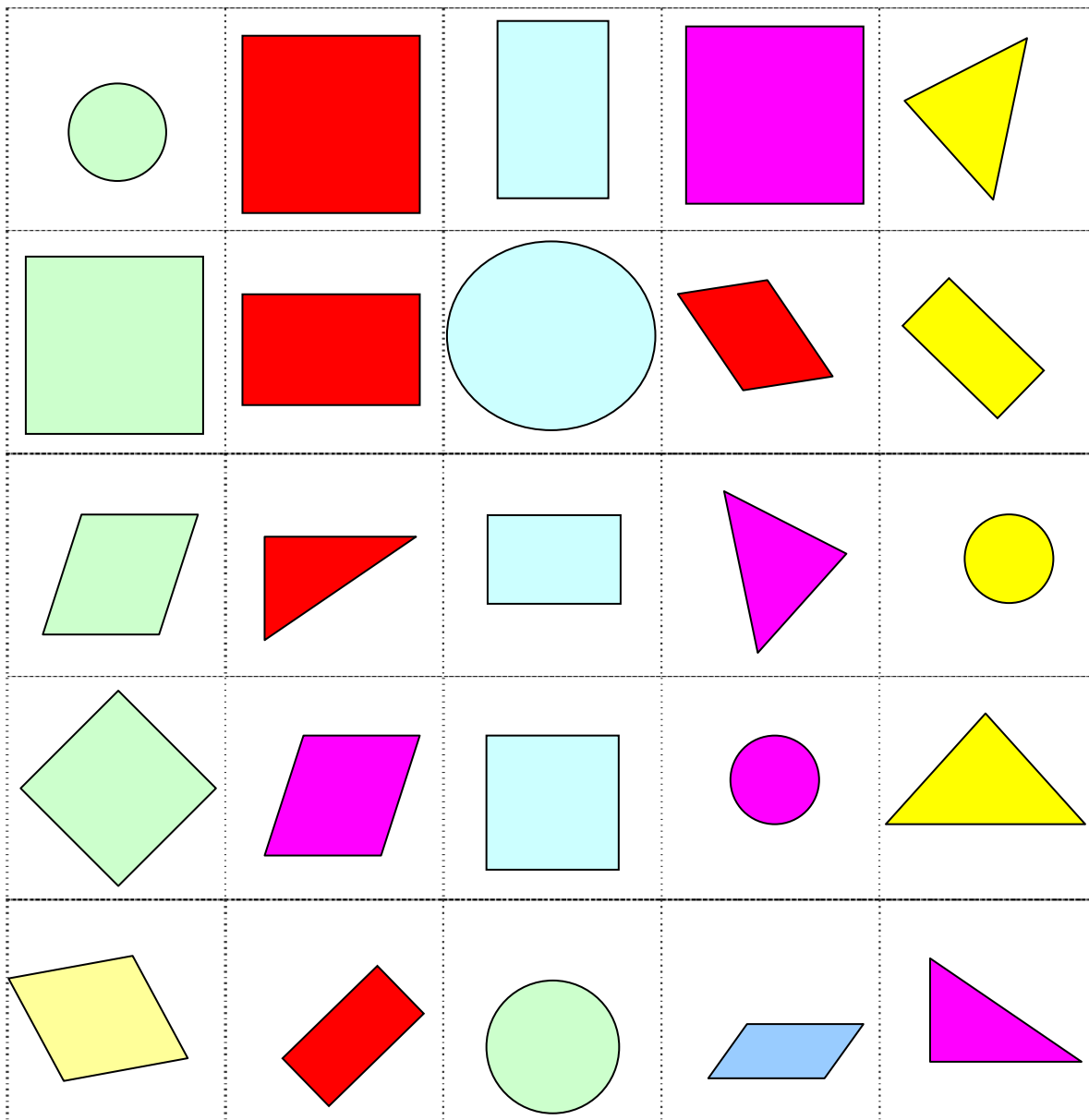
Activity 10.9

Divide the class into small groups and ask each group to divide a number of sticks (Different number for each group) into two heaps in as many ways as they can and write the addition statements for each of those. Write these on the black board. Then ask the class can you think of any other way these could have been divided? If yes how?

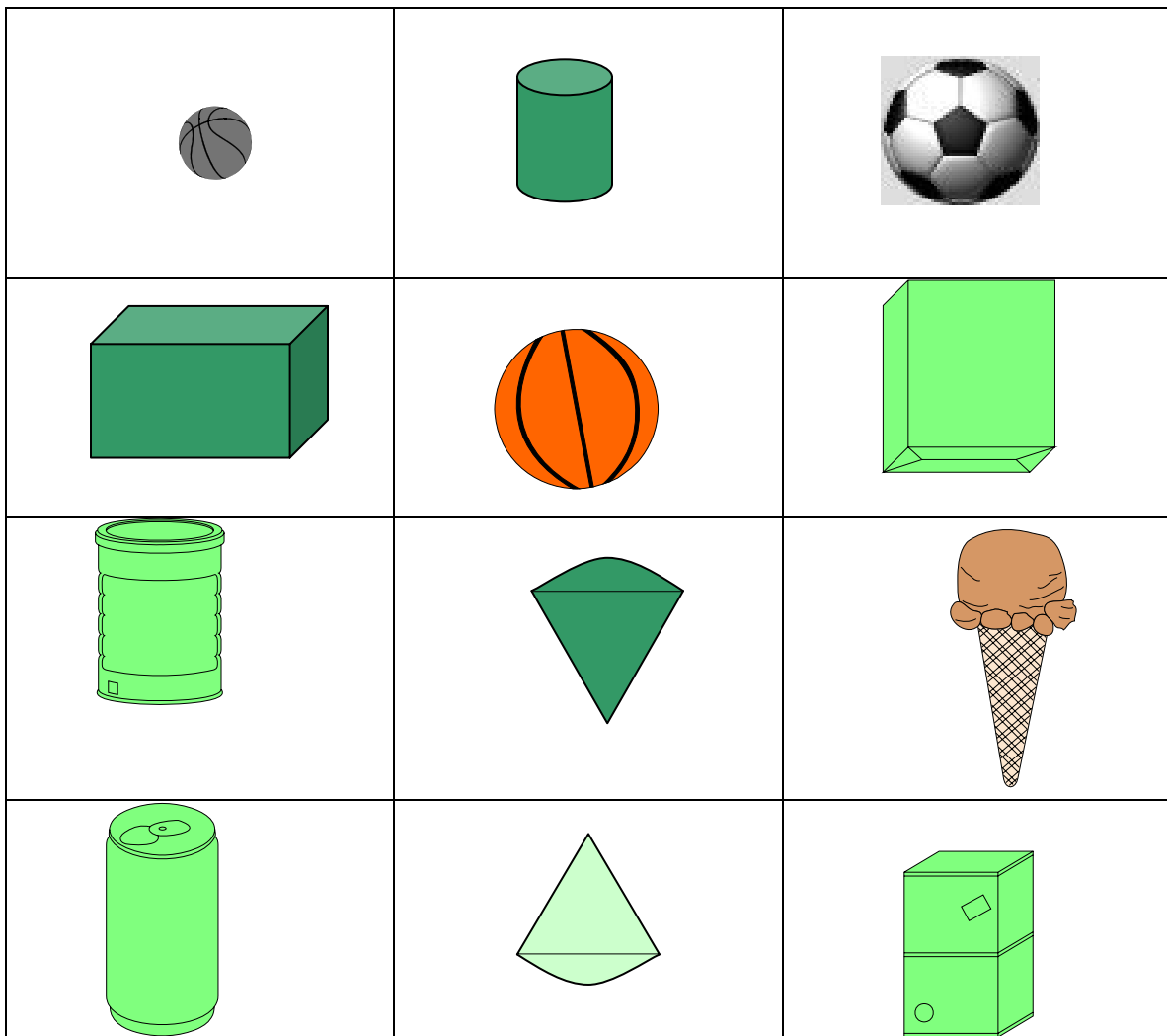
Do you notice any patterns in the addends? (The sum of all of these is the same as the number of sticks)

ACTIVITY SHEETS

Activity Sheet 5.1



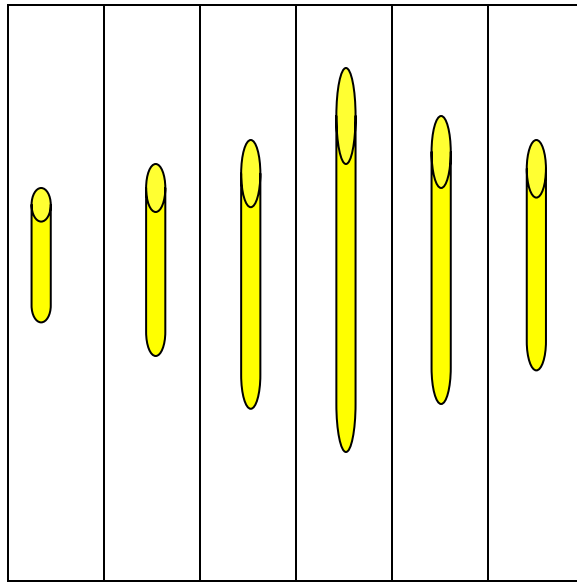
Activity Sheet 5.2



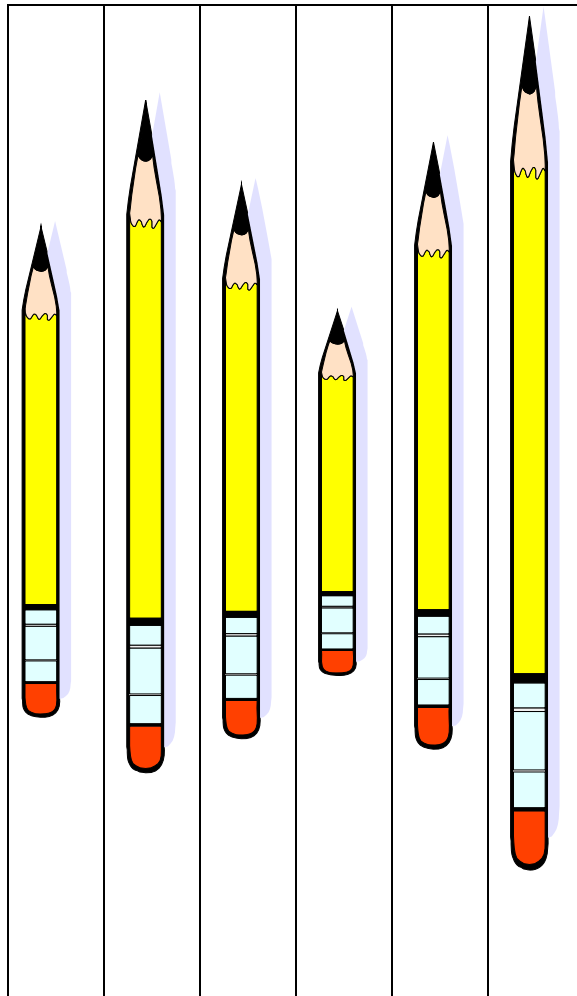
ACTIVITY SHEET 9.1



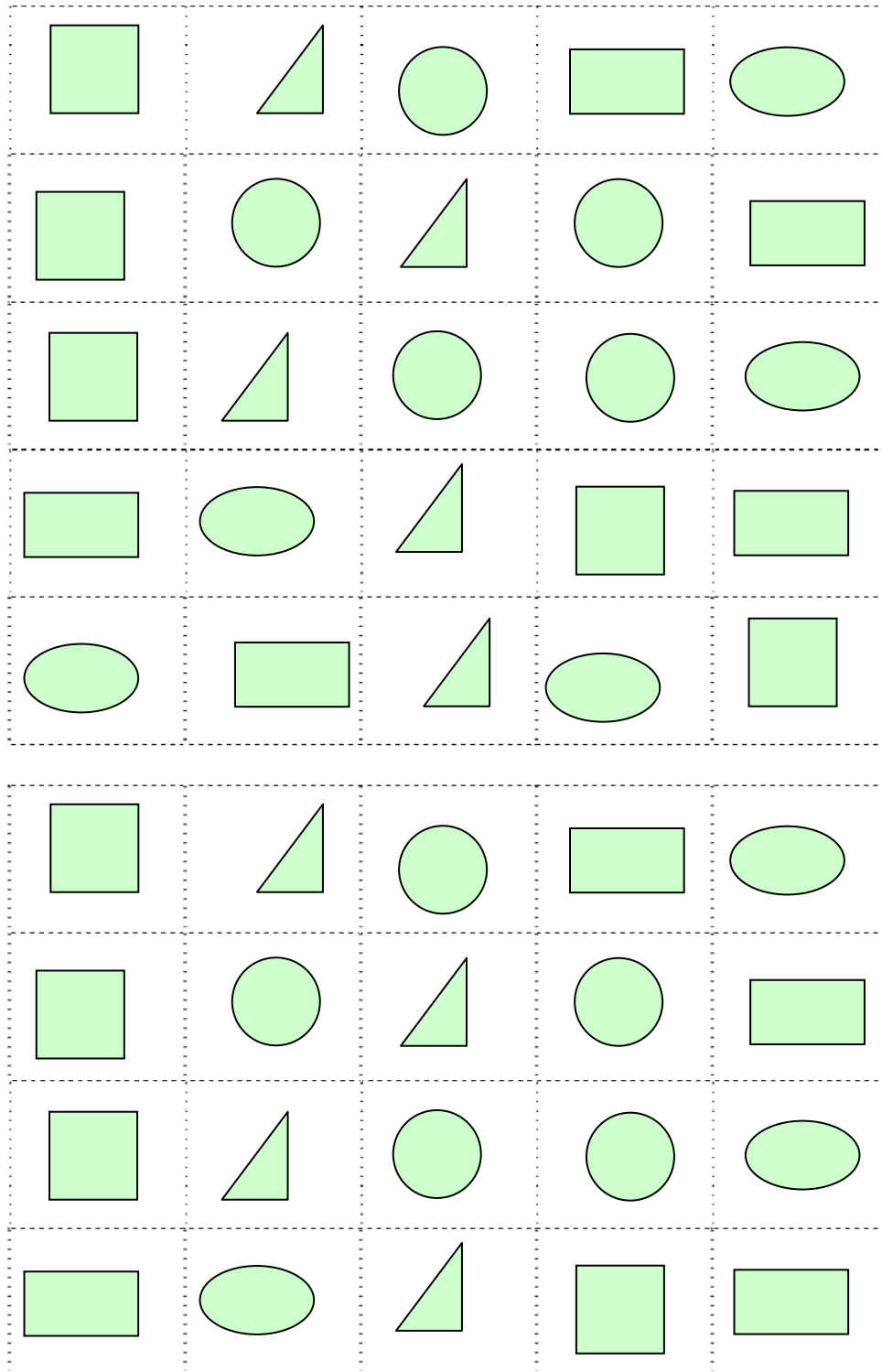
ACTIVITY SHEET 9.2



ACTIVITY SHEET 9.3



Activity Sheet 10.1



Activity Sheet 10.2- The Hundred Table

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Activity Sheet 10.3-Addition Table

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

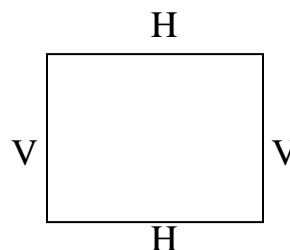
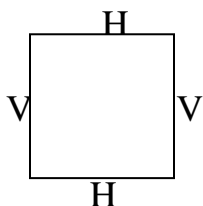
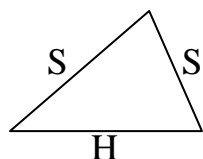
Answers to Selected Exercises

Exercise 5.1

7. They both have 4 sides and all their corners have the same shape.
8. In a square all sides are equal, but in a rectangle only the opposite sides must be equal, the others may be equal but they do not have to be.
9. In a rectangle all the corners have the same shape whereas in a parallelogram only the opposite corners must have the same shape.

Exercise 5.2

4.



Exercise 5.3

2. Cone, cylinder and sphere
3. Cube, cuboid and cylinder
4. Cube and cuboid

Exercise 5.4

Cube and cuboid

cuboid

Cylinder and cone

Neither cube, cuboid, cylinder or cone